Pinellas STAR Center

Quarterly Progress Report
for the
Pinellas STAR Center
Groundwater Cleanup Project

April through June 2001

July 2001

Prepared by
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Project Number PIN–041–0010–02–000
Document Number N0044600

Work Performed Under DOE Contract Number DE–AC13–96GJ87335
Task Order Number MAC01–10

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Acronyms and Abbreviations

AST	air stripper tower
BTEX	benzene, toluene, ethylbenzene, and xylene
°C	degrees Celcius
Center	Pinellas STAR Center
CMS	Corrective Measures Study
CMIP	Corrective Measures Implementation Plan
ComQAP	Comprehensive Quality Assurance Plan
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense non-aqueous phase liquid
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
FL-PRO	Florida Petroleum Range Organics
ft	feet
ft/ft	feet per foot
gpm	gallons per minute
HSWA	Hazardous and Solid Waste Amendment
ICM	interim corrective measures
ICMS	Interim Corrective Measures Study
ITRD	Innovative Treatment Remediation Demonstration
IWNF	Industrial Wastewater Neutralization Facility
MACTEC–ERS	MACTEC Environmental Restoration Services, LLC
MCL	maximum contaminant level
MSL	mean sea level
µmhos/cm	micromhos per centimeter
µg/L	micrograms per liter
mg/L	milligrams per liter
mV	millivolt
NAPL	non-aqueous phase liquid
NGVD	national geodetic vertical datum
NTU	Nephelometric Turbidity Units
PCIC	Pinellas County Industrial Council
POTW	Publicly Owned Treatment Works
PRB	permeable reactive barrier
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFP	Request for Proposal
RPD	relative percent difference
SDWA	Safe Drinking Water Act
STAR	Science, Technology, and Research
STL	Severn Trent Laboratories
SVOC	semivolatile organic compounds
SWMU	solid-waste management unit

TCE	trichloroethene
TVOC	total volatile organic compound
VOCs	volatile organic compounds
WWNA	Wastewater Neutralization Area

1.0 Introduction

The Pinellas Science, Technology, and Research (STAR) Center is a former U.S. Department of Energy (DOE) facility constructed in the mid-1950s in Pinellas County, Florida. The 99-acre STAR Center is located in Largo, Florida, and lies in the northeast quarter of Section 13, Township 30 South, Range 15 East (Figure 1). The STAR Center, while owned by DOE, primarily manufactured neutron generators for nuclear weapons. Other products manufactured at the STAR Center have included radioisotopically powered thermoelectric generators, thermal batteries, specialty capacitors, crystal resonators, neutron detectors, lightning-arrestor connectors, and vacuum-switch tubes. In 1987, the U.S. Environmental Protection Agency (EPA) performed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) at the site to gather information on potential releases of hazardous materials. In February of 1990, EPA issued a Hazardous and Solid Waste Amendment (HSWA) Permit to DOE, enabling DOE to investigate and perform remediation activities in those areas contaminated by hazardous materials resulting from DOE operations. In November 2000, the State of Florida received HSWA authorization from the EPA. On March 17, 1995, DOE sold the facility to the Pinellas County Industrial Council (PCIC). The sales contract included clauses to ensure continued compliance with Federal, State, and local regulations while DOE remediates the site. On July 1, 1999, the PCIC was disestablished and ownership of the STAR Center changed to the Pinellas County government.

Administration of DOE activities at the facility is the responsibility of the DOE Idaho Operations Office. Responsibility for environmental restoration activities, conducted under the EPA RCRA Corrective Action Program, HSWA Amendments of 1984, was transferred from DOE's Pinellas Area Office to DOE's Grand Junction Office in October 1997. MACTEC Environmental Restoration Services, LLC (MACTEC–ERS), a prime contractor to the DOE Grand Junction Office, provides technical support to DOE for remediation and closure of all active solid-waste management units (SWMUs) on site.

Groundwater monitoring and remediation are also ongoing at the 4.5 Acre Site. The 4.5 Acre Site is a parcel of land that was originally part of the DOE facility but was sold to a private individual. In 1984, groundwater contamination was discovered at this site. Currently, DOE leases the site from the land owner and is actively pursuing groundwater cleanup. The 4.5 Acre Site is under purview of Florida State regulations enforced by the Florida Department of Environmental Protection (FDEP). A summary of remediation activities can be found in the *Interim Remedial Action Quarterly Progress Report for the 4.5 Acre Site*.

The EPA RFA Report and the HSWA Permit identified 15 sites at the former DOE facility that may have experienced environmental contamination as a result of past activities. Upon completion of the RCRA Facility Investigation, 11 of the 15 SWMUs were recommended by DOE and approved by EPA Region IV and the FDEP for no further action (DOE 1994). A twelfth site, the Former Pistol Range Site, was remediated in 1993 and recommended by DOE and approved by EPA Region IV and the FDEP for no further action.

Two additional SWMUs, the West Fenceline Site and the Wastewater Neutralization Area/ Building 200 (WWNA/Building 200), were identified after the HSWA permit was issued, bringing the total to 17 SWMUs that have been identified and investigated at the STAR Center. Remediation of the West Fenceline site was completed in 1997 and DOE recommended, and EPA Region IV and FDEP approved, no further action. A Corrective Measures Study

(CMS)/Corrective Measures Implementation Plan (CMIP) was prepared and submitted in 1997 to EPA Region IV and FDEP to address the contamination at the WWNA/Building 200 Area.

Therefore, there are currently four sites that have contamination in the surficial aquifer groundwater at levels in excess of protective standards. These four SWMUs, the Old Drum Storage Site (PIN06), the Industrial Drain Leaks-Building 100 Area (PIN12), the Northeast Site (PIN15), and the WWNA/Building 200 Area (PIN18), have been recommended for or are undergoing remediation activities. Two SWMUs, PIN06 and PIN12, are currently being remediated together because of their similar groundwater contamination and proximity. These two SWMUs are collectively known as the Building 100 Area. Figure 2 depicts the location of the four SWMUs.

Additional background information relative to each SWMU is briefly described below. This document also serves as the quarterly progress report for each of these four SWMUs. The results of monitoring activities, a summary of the treatment system performance, and a summary of ongoing and projected work are provided in this report.

This report represents the annual sampling event for the STAR Center and includes an expanded data visualization section that includes time versus concentration plots for selected analytes and monitoring wells and contaminant plume maps for selected analytes.

1.1 Site Update

A technical and cost evaluation of four vendor responses to the In-Situ Thermal Remediation of Non-Aqueous Phase Liquid (NAPL) at the Northeast Site Request For Proposal (RFP) was conducted during the later part of February and most of March. The responses covered a conceptual design, life cycle schedule, and costs to implement. A vendor was selected and contract negotiations are ongoing. The contract negations will be completed in July. Project design will commence in August and will be completed in October 2001.

At the WWNA, arsenic concentrations continue to be monitored in groundwater recovered from the two recently installed recovery wells. Table 1 provides a summary of the analytical results from the WWNA. The biweekly sampling frequency at the WWNA will continue until September 2001.

1.2 Building 100 Area

The Building 100 Area (PIN06 and PIN12) is located in the southeast portion of the STAR Center. The Old Drum Storage Site is the former location of a concrete storage pad equipped with a drain and containment system used to store hazardous waste including dichloromethane (also known as methylene chloride), ignitable liquids, arsenic, and calcium chromate solids (DOE 1987a). Empty drums containing residual waste solvents were also stored in this area (DOE 1987b). The concrete pad was located near the northwest corner of Building 100. The pad was removed in October 1983 in accordance with a FDEP closure permit (DOE 1987a), and a closure report was submitted to the FDEP in August 1986 (DOE 1986). The decommissioning of the pad and the cessation of drum storage effectively removed the potential for a future contaminant source at PIN06.

Building 100 is the largest building on site and covers approximately 11 acres. In the past, offices, laboratories, and production facilities for the DOE were housed in the building. SWMU PIN12 consists of the liquid waste drainage system serving Building 100. Four individual drainage systems (sanitary, chemical, health physics, and storm water) were present within the building. In 1989, all four drainage systems were investigated, including verifying the system routing and the condition of underground and above-ground piping and ancillary equipment (EMC 1989). As a result of this investigation, the health physics and chemical drainage systems were flushed, grouted, and abandoned. Some of the chemical drain lines were replaced by an above-ground system currently used by tenants of the building.

A CMS and CMIP have been completed and approved for the Building 100 Area because chloroethene (vinyl chloride) and 1,1-dichloroethene (1,1-DCE) concentrations measured in groundwater at the Old Drum Storage Site (PIN06) exceeded the Safe Drinking Water Act (SDWA) and FDEP maximum contaminant levels (MCLs). Furthermore, benzene concentrations measured in groundwater from one monitoring well located at the northwest corner of Building 100 (PIN12) exceeded the SDWA and FDEP MCLs. On August 15, 2000, the EPA approved the Building 100 Corrective Measures Plan Addendum. The FDEP approved this same document on November 15, 1999.

A remediation alternative not previously presented for implementation at Building 100 is a permeable reactive barrier (PRB). A treatability study has been completed to evaluate the possibility of installing a PRB as a potential treatment technology. Commencing in May 2001, DOE has begun an analysis of the potential remediation strategies for Building 100 including the need for a containment barrier to retard the potential of offsite migration of contaminants, source treatment and dissolved phase treatment. The *Building 100 Area Remediation Technology Screening Report* will assemble a list of remediation technologies, categorize them into the remediation tasks, and conduct an initial screening of the technologies. The final technology for each task will be identified at a later date. The initial screening will simply eliminate the technologies that obviously will not work.

1.3 Northeast Site Area

In the late 1960s, before construction of the East Pond, drums of waste and construction debris were disposed of in the swampy area of the Northeast Site. The East Pond was excavated in 1968 as a borrow pit. In 1986, an expansion of the East Pond was initiated to create additional storm-water retention capacity. Excavation activities ceased when contamination was detected directly west of the East Pond. EPA identified the Northeast Site as a SWMU. An Interim Corrective Measures Study (ICMS) was developed and submitted to EPA and approval of this document was received in October 1991. An interim groundwater recovery system for the Northeast Site was installed, and operation commenced in January 1992. The implementation of this interim corrective measures (ICM) system at this site is consistent with the regulatory goals of the EPA's RCRA Corrective Actions (Subpart S).

The ICM system, as initially installed, consisted of four recovery wells equipped with pneumatic recovery pumps, a holding tank, centrifugal transfer pumps, and approximately 2,500 feet (ft) of transfer and secondary containment piping. During 1993, DOE proposed a reconfigured system for the site consisting of four shallow and three deep recovery wells. After EPA approved the system upgrade, the system was reconfigured and became operational on March 1, 1994.

Between August and October 1995, after EPA and FDEP approval, a portion of the Northeast Site was excavated to remove debris and other materials that could inhibit future corrective measures. Location of the areas of excavation was based primarily on the results of a geophysical survey and knowledge of existing utility locations. Detailed descriptions of the debris removal activities were submitted to EPA and FDEP as part of the *Northeast Site Interim Measures Quarterly Progress Report* (DOE 1996).

In 1996, DOE submitted a CMIP to EPA Region IV and FDEP. This plan was approved by both regulatory agencies in 1997. As part of the Northeast Site CMS and CMIP, a pump-and-treat system in conjunction with a subsurface hydrogeologic barrier wall to prevent migration of the contaminant plume was identified as the best available technology. A pretreatment system for iron removal, an air stripper unit, and a tank for holding treated groundwater before discharge to the Pinellas County Publicly Owned Treatment Works (POTW) were recommended. The treatment system was constructed in early 1997 and became operational by July 1997 with seven Northeast Site recovery wells and two Building 100 recovery wells pumping to the system influent tank.

During 1997, anaerobic bioremediation and rotary steam stripping pilot tests were conducted in the northern and southern portions of the Northeast site, respectively. These tests were designed by an Innovative Treatment Remediation Demonstration (ITRD) group of regulatory and industry members to provide remedial options at the STAR Center. At the conclusion of the field tests in July 1997, pump-and-treat technology resumed at the Northeast Site.

1.4 WWNA/Building 200 Area

The WWNA/Building 200 Area includes the active Industrial Wastewater Neutralization Facility (IWNF), the area around Building 200, and the area south of the neutralization facility. The IWNF refers to the physical treatment facility that currently receives sanitary and industrial wastewater and has been in operation since 1957.

A CMS Report and CMIP were completed in 1997 for this SWMU because vinyl chloride, trichloroethene (TCE), and arsenic were detected in surficial aquifer groundwater above Federal and State MCLs. The recommended remediation alternative for the WWNA/Building 200 Area was groundwater recovery with the Building 100 Area wells and an additional recovery well located in the WWNA. The CMIP recommended that recovered water from the additional well be discharged directly to the IWNF and that the recovery well in the WWNA/Building 200 Area takeout will withdraw surficial aquifer groundwater directly from the arsenic plume and thereby reduce the contaminant mass and prevent contaminant migration.

The FDEP response to the CMS/CMIP concerning arsenic soil contamination in the upper 2 ft suggested that a treatment technology, air sparging, was eliminated too early. DOE then proposed a multi-phased Interim Action that included operating the recovery well for 6 months, then pulsing the system, as well as performing geochemical analyses and leaching studies of the site. On January 21, 1999, the FDEP approved the proposed interim remedial action.

Additionally, EPA Region IV also approved the interim remedial action and concurred with the FDEP's position regarding the arsenic contamination. The EPA also requested an addendum or modification to the CMIP that addresses DOE's final selection of the remediation technology and a timeline for the completion of these activities.

In early June 1999, the WWNA recovery well commenced operation. All arsenic concentrations from the WWNA recovery well, PIN18–RW01, were below the STAR Center's daily maximum discharge standard for arsenic in wastewater of 0.20 milligrams per liter (mg/L) until shutdown.

Additional details concerning the impacts of groundwater extraction are reported in the WWNA/Building 200 Area CMIP Addendum (DOE 2000e). Modifications to the recovery of groundwater were proposed based on data collected through November 1999. The CMIP Addendum has been submitted to the regulators and approved by FDEP and EPA. A Statement of Basis (DOE 2000d) was issued by DOE in late September 2000. This document provides a summary of environmental investigations and proposed cleanup alternatives for the WWNA/Building 200 Area. Current activities at the WWNA include groundwater extraction from two recovery wells, PIN18–RW02 and –RW03, and discharge to the STAR Center's wastewater system.

1.5 Quarterly Site Activities

MACTEC–ERS personnel conducted the following tasks at the STAR Center to fulfill the requirements of the scope of work for quarterly sampling:

- Obtained water-level measurements from all monitoring wells, recovery wells, and ponds on April 2, 3, and 4, 2001.

- Conducted the annual sampling event (i.e., collected 171 water samples from monitoring wells, recovery wells, and remediation system components) in April 2001 for analysis of volatile organic compounds (VOCs). Selected monitoring wells at the WWNA were sampled for the analysis of arsenic.

- Reported the results of quarterly sampling events (this document).

- Prepared plume maps for each SWMU, prepared concentration with time trends of selected wells, and provided additional data interpretation for sitewide groundwater activities.

2.0 Water-Level Elevations

2.1 Work Conducted and Methods

Within a 10-hour period on April 2, 2001, depth-to-water measurements were taken at all accessible monitoring wells, test wells, and extraction wells at the STAR Center. In addition, water levels were measured in the ponds and recovery well PIN12–RW02 on April 3 or 4. The water levels were measured with an electronic water-level indicator or by directly reading a staff gauge. Groundwater and surface-water elevations are listed in Table 2, along with measuring point elevations, depths to water, and total well depths.

2.2 Groundwater Flow

Groundwater and surface-water elevations were used to construct sitewide groundwater contour maps of the shallow and deep surficial aquifers (Plates 1 and 2, respectively). Individual contour maps were also constructed for the shallow and deep surficial aquifers at the Northeast Site, and the Building 100 Area (Figure 3 through Figure 6, respectively). All data points, including the four collected on April 3 and 4, were honored when constructing the interpretive contours.

The water levels throughout the STAR Center indicate that the water table is highest in the area between the 4.5 Acre Site and the WWNA (Plates 1 and 2). As groundwater flows from this recharge area, it disperses in a radial pattern to the north, east, and southeast across the STAR Center. These flow patterns are similar for both the shallow and deep surficial aquifers.

At the Northeast Site, groundwater flow patterns, especially in the deep surficial aquifer, are greatly affected by withdrawals from ten active recovery wells. The cones of depression resulting from the pumping of these recovery wells are particularly evident on Figure 4. The overall influence of the recovery wells in the deep surficial aquifer extends to the periphery of the Northeast Site in all directions.

Along the northern boundary of the Northeast Site, the contours near the slurry wall indicate that the wall continues to be a significant barrier to groundwater flow. As seen on Figure 4, there is a differential of about 5 ft between the downgradient and upgradient side of the wall as measured in monitoring wells PIN15–M24D and –M33D. This differential is similar to that observed last quarter. This differential at the slurry wall continues to suggest that only a minimal amount of groundwater recharge to the deep surficial aquifer is derived from the pond. Otherwise, the differential between these two wells would be smaller and groundwater gradient would be steeper near the pond, indicating recharge to the groundwater system. The steepness of the water table immediately west of the East Pond, however, indicates that the pond is recharging the shallow surficial aquifer (Figure 3).

In the shallow surficial aquifer in the southern part of the Northeast Site, the hydraulic gradient was approximately 0.013 feet per foot (ft/ft). Using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, groundwater in the southern part of the site is estimated to move about 16 ft/year under natural (non-pumping) conditions.

In the south-central part of the STAR Center, surficial aquifer flow (shallow and deep) is influenced by groundwater withdrawals from two recovery wells (PIN12–RW01 and –RW02) in the northwest corner of Building 100 (Figure 5 and Figure 6). In addition, shallow surficial aquifer flow is influenced by withdrawals from recovery well PIN18–RW03 at the WWNA. Shallow groundwater beneath Building 100 flows out laterally to the north, east, and south. Surficial groundwater at the WWNA flows to the southeast, except where affected by recovery well withdrawals. The hydraulic gradient beyond the influence of pumping at the Building 100 and WWNA Areas was approximately 0.005 ft/ft. Using the approximations mentioned above, groundwater flow velocity in these areas is estimated to be about 6 ft/year.

Water-level elevations in the three wells screened in the upper part of the Floridan aquifer are presented in Table 3. The relative elevations in these wells are consistent with the regional groundwater flow direction, towards the northeast and Tampa Bay, for the Floridan aquifer.

A downward vertical hydraulic differential of approximately 6.6 ft existed between the surficial aquifer wells and Floridan aquifer wells at the Northeast Site. Table 4 illustrates the vertical hydraulic differential. This differential is consistent with the historical range of 5 to 9 ft.

Surface-water elevations were recorded from all four ponds at the site and are presented in Table 5. The ponds are hydraulically connected to the shallow surficial aquifer system. The surface-water elevations for the East and West Ponds increased since last quarter's measurements; the water levels in the South and Southwest Ponds went down. The South Pond elevation of 13.67 ft was below both the drain holes in the vertical concrete containment around the pond. The South and Southwest Pond elevations were essentially the same.

3.0 Groundwater Sampling and Analytical Results

3.1 Work Performed and Methods

During annual sampling in April 2001, groundwater samples were collected from 171 monitoring wells by MACTEC–ERS personnel. All samples were analyzed for VOCs using EPA Method 8021. Ten samples were also analyzed for arsenic using EPA Method 6010. Laboratory reports for VOCs, and arsenic analyses are provided in Appendix A.

During the period of April 1 to June 30, 2001, the remediation system influent and effluent at the Northeast Site, as well as selected recovery wells at the Northeast Site, were also sampled. Analytical results for remediation system VOCs, iron, and hardness (as $CaCO_3$) sampling are provided in Appendix B.

Beginning on February 26, 2001, samples were collected from PIN18–EFF1, –RW02 and –RW03 and analyzed for arsenic using EPA Method 6010. PIN18–EFF1 is the combined effluent from PIN18–RW02 and –RW03 upstream of the IWNF. PIN18–EFF2 is the effluent from the IWNF. This sampling will be ongoing until September 2001; the available data are summarized in Section 1.1 and presented in Appendix C.

All samples were collected in accordance with the MACTEC–ERS *Comprehensive Quality Assurance Plan* (ComQAP) (FDEP No. 970141–3), which is on file with the FDEP. All samples collected were submitted to Severn Trent Laboratories (STL), and analyzed under their FDEP-approved ComQAP (FDEP No. 890142G). The majority of monitoring wells were micropurged using a dedicated bladder pump, and sampling was performed when the field measurements stabililized. The remaining wells were conventionally purged with a peristaltic pump or a 2-inch diameter stainless-steel submersible pump; purging was considered complete when five well volumes were purged and one set of field measurements was taken. Extraction wells were sampled using their associated flowlines with dedicated sampling ports. Table 6 lists field measurements of pH, specific conductance, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature recorded at the time the sample was collected. Measurements were made with a flow cell and a multiparameter instrument.

3.2 Analytical Results

3.2.1 Northeast Site (PIN15)

Total VOCs (TVOCs), benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations in samples collected from wells at the Northeast Site (PIN15) are included in Table 7 and Table 8, respectively. Table 9 provides data on additional VOCs detected that are not included in Table 7 and Table 8. Figure 7 shows the TVOC concentrations and includes BTEX compounds.

No VOCs were detected in the 33 monitoring wells listed below:

PIN15–0506	PIN15–0520	PIN15–M12D	PIN15–M18S	PIN15–M32D
PIN15–0507	PIN15–0523	PIN15–M12S	PIN15–M24D	PIN15–M32S
PIN15–0510	PIN15–0530	PIN15–M14D	PIN15–M26D	PIN15–M33D
PIN15–0513	PIN15–0531	PIN15–M14S	PIN15–M27S	PIN15–NRW1
PIN15–0515	PIN15–0534	PIN15–M16D	PIN15–M28D	PIN15–NRW2
PIN15–0516	PIN15–0559	PIN15–M16S	PIN15–M29S	
PIN15–0518	PIN15–M03S	PIN15–M18D	PIN15–M30S	

The 37 monitoring wells listed below contained detectable VOCs:

PIN15–0502	PIN15–0557	PIN15–M28S	PIN15–M37D	PIN15–RW13
PIN15–0503	PIN15–0558	PIN15–M29D	PIN15–NRW4	PIN15–RW14
PIN15–0514	PIN15–DRW5	PIN15–M30D	PIN15–RW04	PIN15–RW15
PIN15–0533	PIN15–M03D	PIN15–M31D	PIN15–RW07	PIN15–RW16
PIN15–0535	PIN15–M17D	PIN15–M31S	PIN15–RW08	PIN15–RW17
PIN15–0536	PIN15–M17S	PIN15–M34D	PIN15–RW09	
PIN15–0537	PIN15–M26S	PIN15–M35D	PIN15–RW11	
PIN15–0538	PIN15–M27D	PIN15–M36D	PIN15–RW12	

TVOCs concentrations ranged from 1.0 micrograms per liter (µg/L) in well PIN15–0503 to 2,995,000 µg/L in well PIN15–M35D. The compound detected at the highest concentration in PIN15–M35D was methylene chloride at a concentration of 2,500,000 µg/L.

3.2.2 Building 100 Area (PIN12)

TVOCs and BTEX concentrations in samples collected from wells sampled at the Building 100 area (PIN12) are included in Table 7 and Table 8, respectively. Table 9 provides data on additional VOCs detected that are not included in Table 7 and Table 8. Figure 8 shows the TVOCs concentrations and includes BTEX compounds.

No VOCs were detected in the 27 monitoring wells listed below:

PIN12–0508	PIN12–0517	PIN12–S56C	PIN12–S62B	PIN12–S65D
PIN12–0510	PIN12–0522	PIN12–S56D	PIN12–S62D	PIN12–S66B
PIN12–0511	PIN12–0527	PIN12–S57B	PIN12–S64B	PIN12–S66D
PIN12–0512	PIN12–0528	PIN12–S59D	PIN12–S64D	
PIN12–0515	PIN12–S36B	PIN12–S61B	PIN12–S65B	
PIN12–0516	PIN12–S56B	PIN12–S61C	PIN12–S65C	

Samples from the 37 monitoring wells list below contained VOCs at detectable levels. They are:

PIN12–0509	PIN12–0525	PIN12–S33C	PIN12–S59B	PIN12–S63C
PIN12–0513	PIN12–0526	PIN12–S35B	PIN12–S59C	PIN12–S63D
PIN12–0514	PIN12–RW01	PIN12–S37B	PIN12–S60B	PIN12–S64C
PIN12–0518	PIN12–RW02	PIN12–S54D	PIN12–S60C	PIN12–S66C
PIN12–0520	PIN12–S29C	PIN12–S55B	PIN12–S60D	PIN12–TE03
PIN12–0521	PIN12–S30B	PIN12–S55C	PIN12–S61D	
PIN12–0523	PIN12–S31B	PIN12–S57C	PIN12–S62C	
PIN12–0524	PIN12–S32B	PIN12–S57D	PIN12–S63B	

Detected TVOCs concentrations ranged from 1 µg/L in well PIN12–S60D to 129,000 µg/L in well PIN12–S35B. The compound detected at the highest concentration in PIN12–S35B was cis-1,2-DCE at a concentration of 71,000 µg/L.

Three Floridan aquifer wells were sampled, PIN12–0527, PIN12–0528, and PIN15–0513. No compounds were detected above the reporting limit. Methylene chloride was present in two wells at estimated levels that were above the instrument detection limit but below the reporting limit, however this result is probably an analytical artifact because methylene chloride was detected in most of the trip blanks.

3.2.3 Wastewater Neutralization Area (PIN18)

Arsenic samples were collected at 10 wells. Arsenic concentrations are listed in Table 10 and shown in
Figure 9. The highest concentration of arsenic detected was 0.55 mg/L in PIN18–0501.

No VOCs were detected in the 20 monitoring wells listed below:

PIN18–0501	PIN18–0506	PIN18–0511	PIN18–0517	PIN18–0522
PIN18–0502	PIN18–0507	PIN18–0512	PIN18–0518	PIN18–0524
PIN18–0503	PIN18–0508	PIN18–0514	PIN18–0520	PIN18–RW02
PIN18–0504	PIN18–0509	PIN18–0516	PIN18–0521	PIN18–RW03

Samples from the five monitoring wells list below contained VOCs at detectable levels. They are:

PIN18–0500	PIN18–0505	PIN18–0513	PIN18–0519	PIN18–0526

Detected TVOCs concentrations ranged from 1.1 µg/L in well PIN18–0505 to 5.4 µg/L in well PIN18–0500. The compound detected at the highest concentration in PIN18–0500 was cis-1,2-DCE at a concentration of 3.3 µg/L.

3.2.4 Perimeter and Other Monitoring Wells (PIN21, PIN06, PIN09, and PIN10)

Concentrations of TVOCs compounds measured in four samples from perimeter monitoring wells are included in Table 7. No BTEX compounds were detected. Figure 8 shows the TVOCs concentrations for the PIN21 wells.

No VOCs were detected in the seven monitoring wells listed below:

PIN05–0500	PIN21–0500	PIN21–0503	PIN21–0505
PIN10–0500	PIN21–0502	PIN21–0504	

Samples from the five monitoring wells listed below contained VOCs at detectable levels:

PIN06–0500	PIN06–0501	PIN09–0500	PIN21–0501	PIN21–0512

Detected TVOCs concentrations ranged from 1.1 µg/L in well PIN21–0501 to 4.4 µg/L in well PIN09–0500. The compound detected at the highest concentration in PIN09–0500 was trichlorofluoromethane at a concentration of 2.4 µg/L.

3.3 Quality Assurance/Quality Control

MACTEC–ERS checked the analytical results from STL for quality assurance/quality control (QA/QC). Eighteen duplicate samples were collected. Results of VOCs and arsenic analyses for each valid duplicate sample are listed in Table A–1 (Appendix A). The duplicate sample results were compared and the relative percent differences (RPDs) between the results were calculated. One sample/duplicate pair from PIN12–S57D did not meet the guidance criterion that the RPD results should be within the range of ±30 percent when the concentration is greater than 5 times the detection limit. This sample failed the criterion for 1,1-DCE and TCE. This is a failure rate of less than 0.5 percent. All other data passed QA/QC criteria at a Class A level, indicating that all data may be used for quantitative and qualitative purposes.

According to FDEP guidelines, duplicate samples should be collected at a frequency of one duplicate for every 10 or fewer samples. There were 171 groundwater samples analyzed for VOCs and 17 duplicate VOC samples collected. There were 18 groundwater samples analyzed for arsenic and two duplicate samples. The duplicate goal was not met for VOCs for this sampling event.

During the quarterly sampling event, 15 trip blanks and three equipment blanks were submitted for analysis. Most of the trip blanks showed estimated methylene chloride levels above the instrument detection limit but below the reporting limit. The highest estimated methylene chloride concentration was 0.98 µg/L. One trip blank, submitted with laboratory requisition group B1511750, had a reported cis-1,2-DCE level of 1.1 µg/L and a TCE level of 1.5 µg/L. This problem was reported to the analytical laboratory.

4.0 Data Visualization

Over 600 concentration with time plots were created to determine whether or not any trends were evident regarding the contaminants of concerns for each SWMU. This overall data set was evaluated and selected wells and contaminants of concern were chosen to be presented in a concentration with time plot. Sampling frequency and detection limits provide challenges in identifying and assessing trends. Some wells are sampled four times per year, some twice per year, and some only once per year. Over time, changes in reporting limits, instrument detection

limits, and samples have been diluted at varying concentrations, all of which tend to mask or mute trends.

Several criteria were employed to focus the data visualization evaluation:

- Wells in a downgradient position were selected so that plume movement might be monitored,
- In most cases, only data from the last 3 years are shown in the graphs, and
- Graphs and charts for each monitoring well utilize the same scale to depict concentration levels.

Plume maps have been generated for the TVOCs plume area and separate plume maps have then been generated for selected individual compounds within the TVOCs plume. The compound-specific MCL has been utilized to draw the inferred plume boundary within each TVOC boundary.

4.1 Contaminant Concentration Trends

Monitoring wells PIN15–0537 and –0558 were chosen to depict plume movement at the Northeast Site. Well –0537 lies in the southern area of the plume and well –0558 lies along the southern edge of the plume. For each well, the concentration with time plots for cis-1,2-DCE and vinyl chloride are depicted in Figure 10 and Figure 11, respectively.

At the WWNA, three wells were chosen to depict plume movement. Wells PIN18–0500, –0522, and –0525 were chosen because they are shallow wells containing the highest arsenic concentrations in the plume area. The bulk of the arsenic contamination appears to be relatively shallow. Figure 12 shows the arsenic concentration for all three wells.

Monitoring wells PIN21–0512 and PIN12–S66C were chosen to depict plume migration at the Building 100 Area. Well –0512 lies along the southern boundary and well –S66C lies along eastern boundary of the STAR Center. Vinyl chloride was chosen as the compound most indicative of plume movement and Figure 13 depicts vinyl chloride concentrations over time in wells –0512 and –S66C.

4.2 Plume Maps

Plume maps for the Northeast Site have been generated for TVOCs (Figure 14), vinyl chloride (Figure 15), cis-1,2-DCE (Figure 16), TCE (Figure 17), methylene chloride (Figure 18), toluene (Figure 19), and benzene (Figure 20).

Figure 21 depicts the arsenic plume at the WWNA.

Plume maps for the Building 100 Area have been generated for TVOCs (Figure 22), vinyl chloride (Figure 23), cis-1,2-DCE (Figure 24), and TCE (Figure 25). The inferred TVOCs plume boundary includes all detected concentrations of all analytes. The inferred plume boundaries for the individual compounds are the respective MCLs of the compounds. Concentrations that are below the MCL are not included in the plume.

4.3 Geochemical Parameters

Geochemical parameters measured in all wells at the STAR Center during the last four quarters of sampling (July 2000 to April 2001) are summarized in Table 11. Conditions across the STAR Center generally are reducing as evidenced by the low average values of DO and ORP.

5.0 Treatment System and Recovery Well Performance

5.1 Northeast Site and Building 100

The Northeast Site groundwater treatment system was operational from April 1 through June 30, 2001. During this quarter, all available recovery wells in the Northeast Site wellfield and at Building 100 were operational. PIN15–RW10 at the Northeast Site has remained shut off due to problems with low groundwater recovery (approximately 0.1 to 0.4 gpm) and has been replaced by PIN15-RW06. A new pump was placed in RW06 in June. The pump was specifically designed for application in low-yield recovery wells that have high concentrations of solvents in the groundwater. Operation to date has been continuous without any problems.

Table 12 provides a summary of analytical results for samples collected at the Northeast Site Treatment System during this quarter. FeRemede® continues to be utilized to effectively control the deposition of iron and hardness salts. The application of sodium hypochlorite as a microbiocide continues to effectively prevent biological fouling of the air stripper tower (AST).

From April 1 through June 30, 2001, 2,452,063 gallons of groundwater were recovered from the Northeast Site and Building 100 recovery wells. The volume of recovered groundwater treated by the Northeast Site Treatment System since its startup in June 1997 through June 2001 is presented in Chart 1. Charts 2, 3, and 4 present the monthly volume of groundwater recovered during April through June 2001 from the Northeast Site recovery wells.

The treatment system and recovery wells experienced downtime for a few hours in April to allow installation of a new effluent meter and replacement of a failed pump. The treatment system and recovery wells operated continuously through May. For the month of June, the system and wells experienced two shutdowns from excessively heavy rainfall. The monthly groundwater recovery from April through June 2001 for the Building 100 recovery wells is presented in Charts 5, 6, and 7, respectively.

Total percent on-time for the Northeast Site AST is illustrated in Chart 8. On-time for the AST for this quarter was affected by the above-described minor outages. Data Table 6 (Historical Summary of Groundwater at the Northeast Site and Building 100) shown in the previous quarterly reports now resides in Appendix D and is identified as Table D–1. The previous Table D–1, Historical Summary of Groundwater at the Northeast Site and Building 100, is no longer shown. This table has been eliminated now that flowmeters at recovery wells are only calibrated on a yearly basis and recovery well volumes are now recorded on a weekly basis (which may not coincide with the first and last day of a month). However, the more accurate influent flowmeter at the treatment system is now used to track total wellfield influent flow and Charts 2 through 7 show individual recovery well volumes on a weekly basis.

Table 13 in this report presents the calculated pounds of selected analytes recovered from the Northeast treatment system AST for each month of this reporting period. These monthly results are based on the measured system influent concentration and influent groundwater flow.

5.2 Wastewater Neutralization Area

The two new recovery wells (PIN18–RW02 and –RW03) at the WWNA became operational on February 26, 2001. These new recovery wells replace the previous recovery well, PIN18–RW01. Each new well produces approximately 2.5 gpm continuously with an electrical submersible pump set at approximately 12 ft below land surface. The effluent groundwater from each well is combined into a common header pipe and discharged into the industrial wastewater receiving tank at the IWNF. During this quarter, 529,206 gallons of groundwater were recovered from the IWNF. Since start-up on February 26, both wells have operated continuously.

6.0 Current and Project Work

6.1 Summary

Work for April through June 2001 included sampling of groundwater monitoring wells and recovery wells for water quality, flow, and water levels. The treatment system and recovery wells were operated during the entire quarter, except for one short period of downtime described in Section 5.0.

6.2 Project Work Conducted

- The Northeast Site treatment system influent, clear well, and effluent were sampled during the quarter. Treatment system effluent samples were analyzed for VOCs and the effluent discharge volume was recorded to comply with the county wastewater permit. In the effluent samples, all volatile organic aromatic compound concentrations were under the Pinellas County regulatory limit of 50 µg/L.

- Installation of a new pump in RW06.

- Maintenance performed during the quarter was limited to minor maintenance activities and replacement of the previously mentioned components in Section 5.0.

7.0 Conclusions

The following conclusions are based on annual sampling conducted in April 2001.

- No significant changes in the surficial groundwater flow direction or relative potentiometric levels were observed for the prevailing pumping and seasonal recharge conditions.

- The cone of depression at the Northeast Site includes the area of monitoring well PIN15–0558 and the southernmost portion of the contaminant plume.

- The highest concentration of VOCs was detected at the Northeast Site well PIN15–M35D.

- Concentrations of VOCs decreased in downgradient monitoring well PIN15–0558 and the operation of recovery well PIN15–RW16 appears to be controlling plume movement along the southern perimeter of the Northeast Site.

8.0 Tasks to Be Performed Next Quarter

The following tasks are expected to be conducted during the next quarterly period (July through September 2001):

- Quarterly sampling activities will occur in early July 2001.

- Weekly and monthly sampling and analysis of groundwater will continue in order to provide compliance and system operations data.

- Treatment system optimization will continue as new issues develop.

- Utilization of the dedicated bladder pumps for quarterly sampling using the FDEP-approved micropurging technique.

9.0 References

EMC, 1989. *Conceptual Design Report to Upgrade the Existing Drain System, U.S. Department of Energy, Pinellas Plant*, prepared by EMC Engineers, Inc., for General Electric Company, Neutron Devices Department, Pinellas Plant, Pinellas County, Largo, Florida, June.

U.S. Department of Energy, 1986. *Old Drum Storage Pad Closure Certification*, U.S. Department of Energy, Pinellas Plant, Largo, Florida.

———, 1987a. *Draft Environmental Survey Sampling and Analysis Plan for the Pinellas Plant, Largo, Florida*, U.S. Department of Energy, Office of Environmental Audit, July 24.

———, 1987b. *Phase 1. Installation Assessment Pinellas Plant*, Draft, Comprehensive Environmental Assessment and Response Program, U.S. Department of Energy, Albuquerque Field Office, Albuquerque, New Mexico, June

———, 1994. *Statement of Basis for Twelve Solid Waste Management Units Recommended for No Further Action*, U.S. Department of Energy, Pinellas Plant, Largo, Florida, January.

———, 1996. *Northeast Site Interim Measures Quarterly Progress Report*, U.S. Department of Energy, January.

U.S. Department of Energy, 2000a. *NAPL Treatment Technology Review*, GJO–2000–180–TAR, MAC–PIN 13.10.3, U.S. Department of Energy, Grand Junction Office, Grand Junction Colorado, November.

———, 2000b. *Northeast Site NAPL Characterization Report*, GJO–2000–165–TAR, MAC–PIN 13.10.3, U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, October.

U.S. Department of Energy, 2000c. *Northeast Site NAPL Characterization Report Addendum*, GJO–2000–165A–TAR, MAC–PIN 13.10.3, U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado, December.

———, 2000d. *Statement of Basis Wastewater Neutralization Area/Building 200 Area*, MAC–PIN 12.3.1, prepared by MACTEC–ERS, Grand Junction, Colorado, for U.S. Department of Energy, September.

———, 2000e. *Wastewater Neutralization Area/Building 200 Area Corrective Measures Implementation Plan Addendum*, prepared by MACTEC–ERS, Grand Junction, Colorado for U.S. Department of Energy, January.

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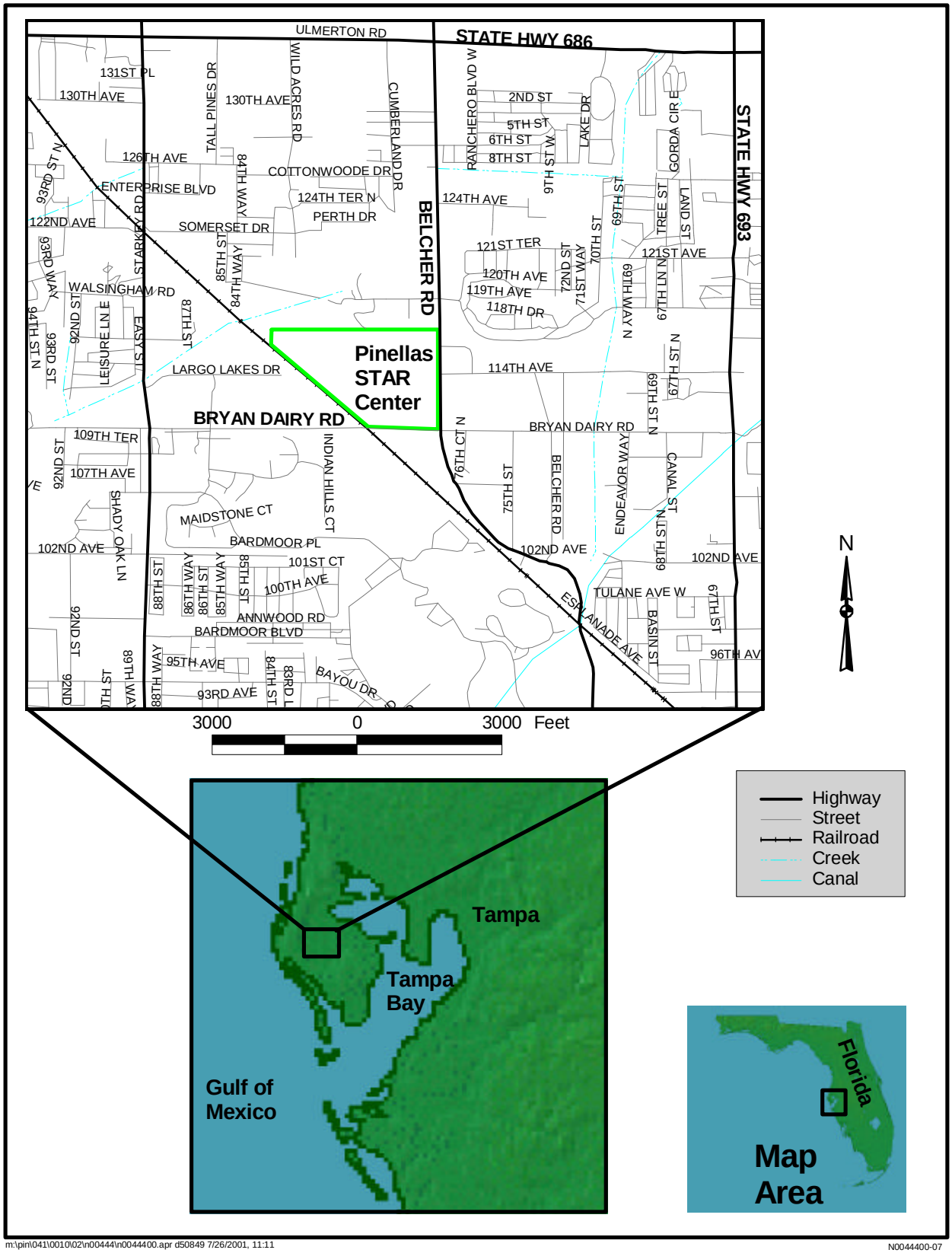

Figure 1. Pinellas STAR Center Location

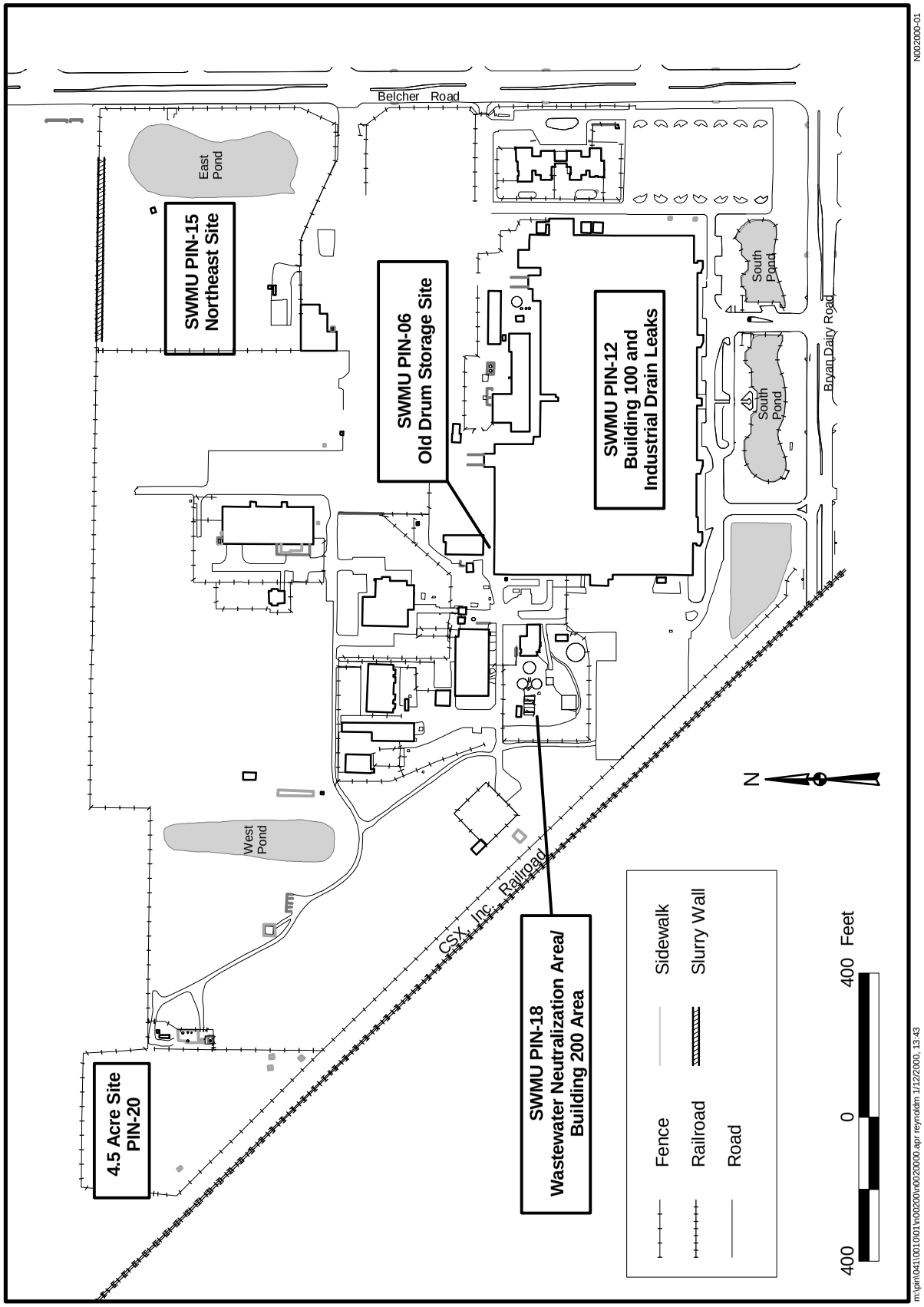

Figure 2. Location of Pinellas STAR Center Solid Waste Management Units (SWMUs)

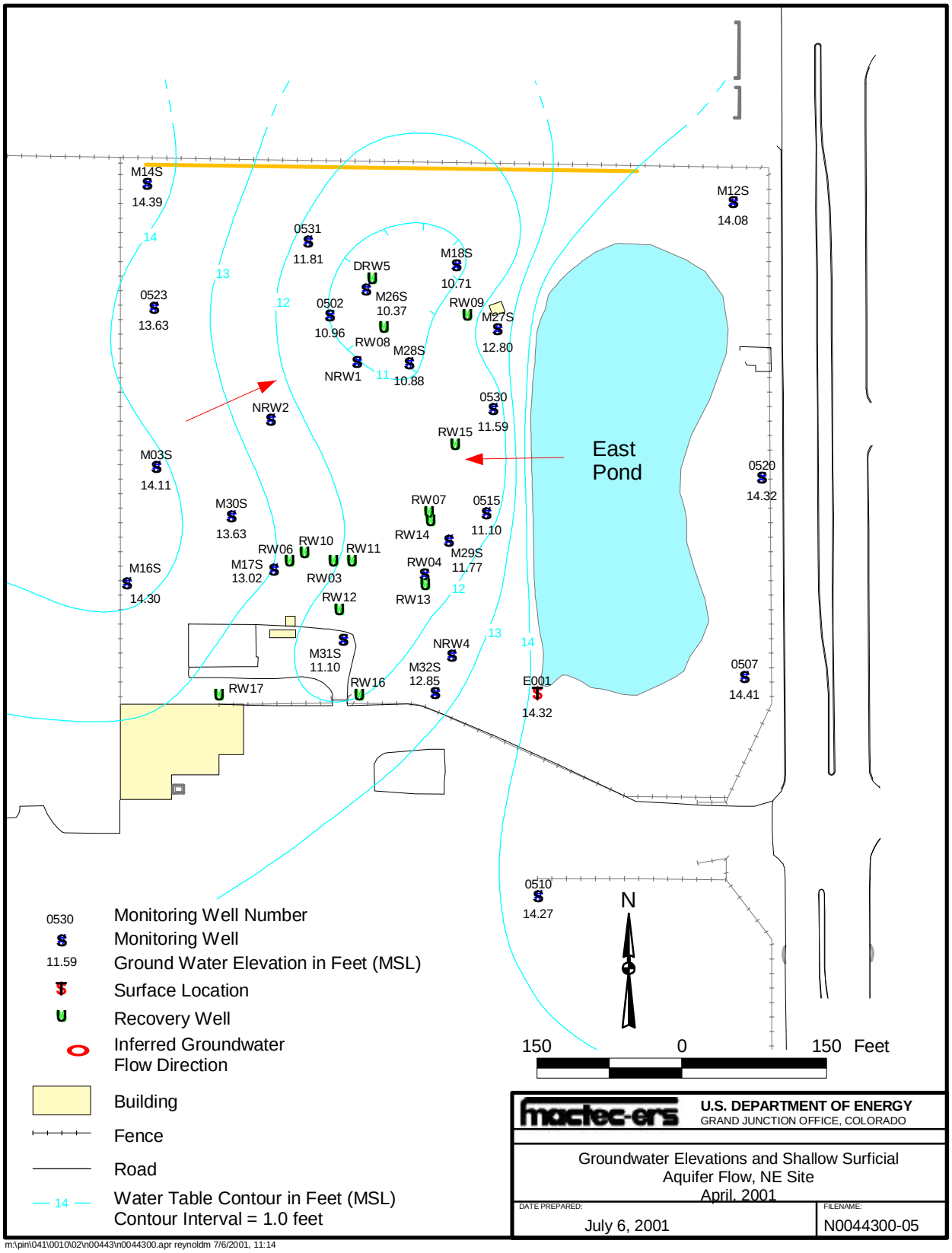

Figure 3. Groundwater Elevations and Shallow Surficial Aquifer Flow, Northeast Site, April 2001

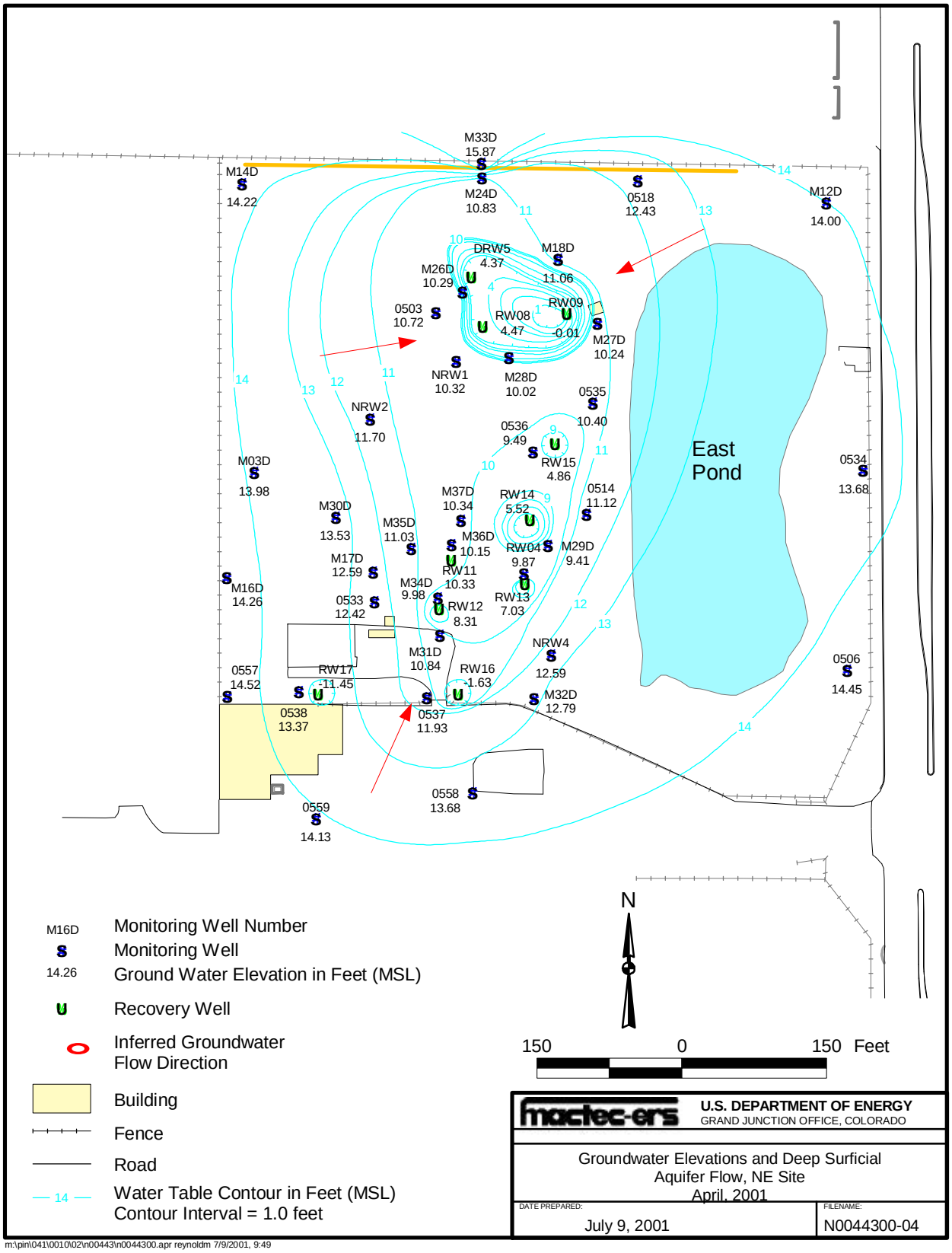

Figure 4. Groundwater Elevations and Deep Surficial Aquifer Flow, Northeast Site, April 2001

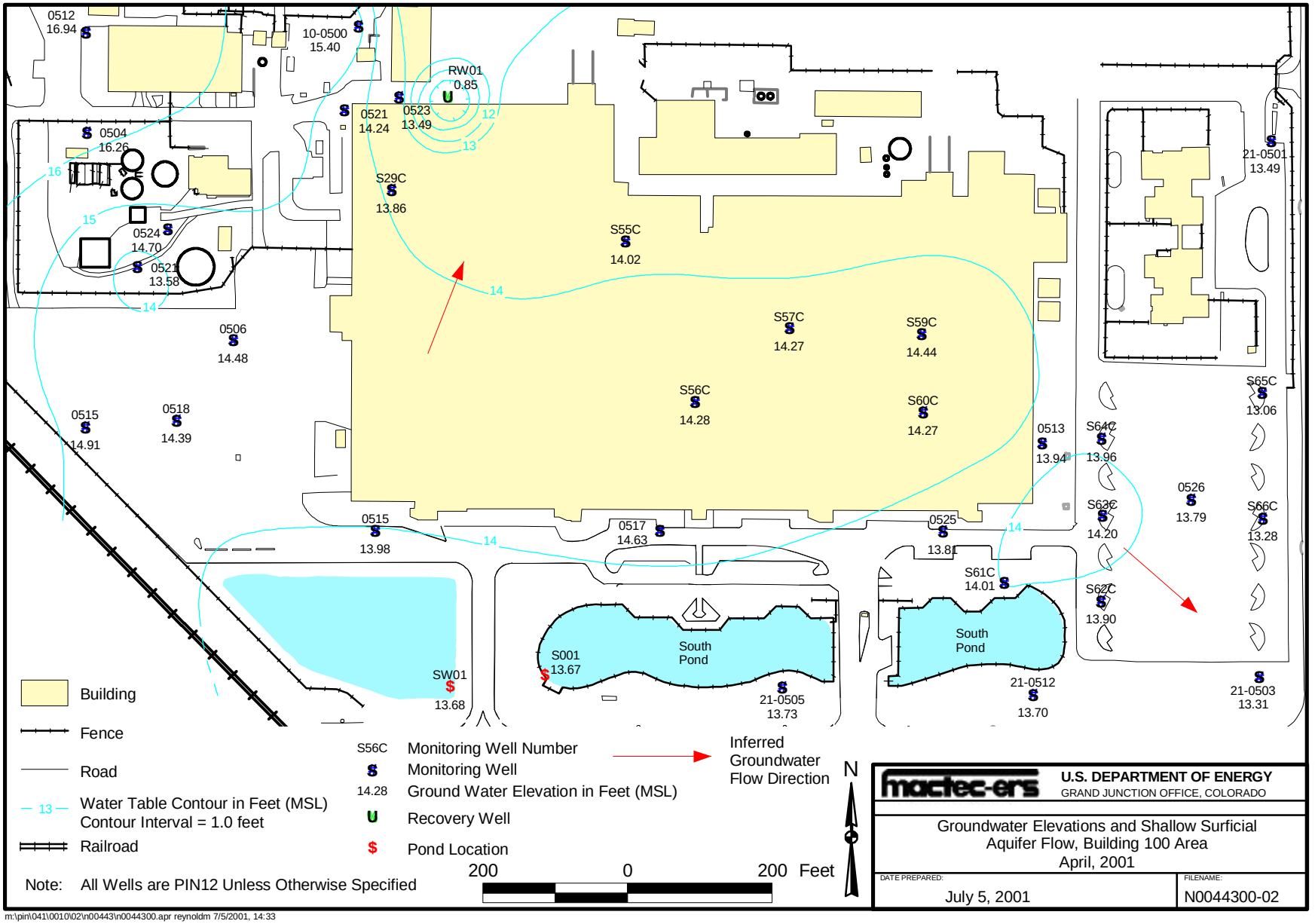

Figure 5. Groundwater Elevations and Shallow Surficial Aquifer Flow, Building 100 Area, April 2001

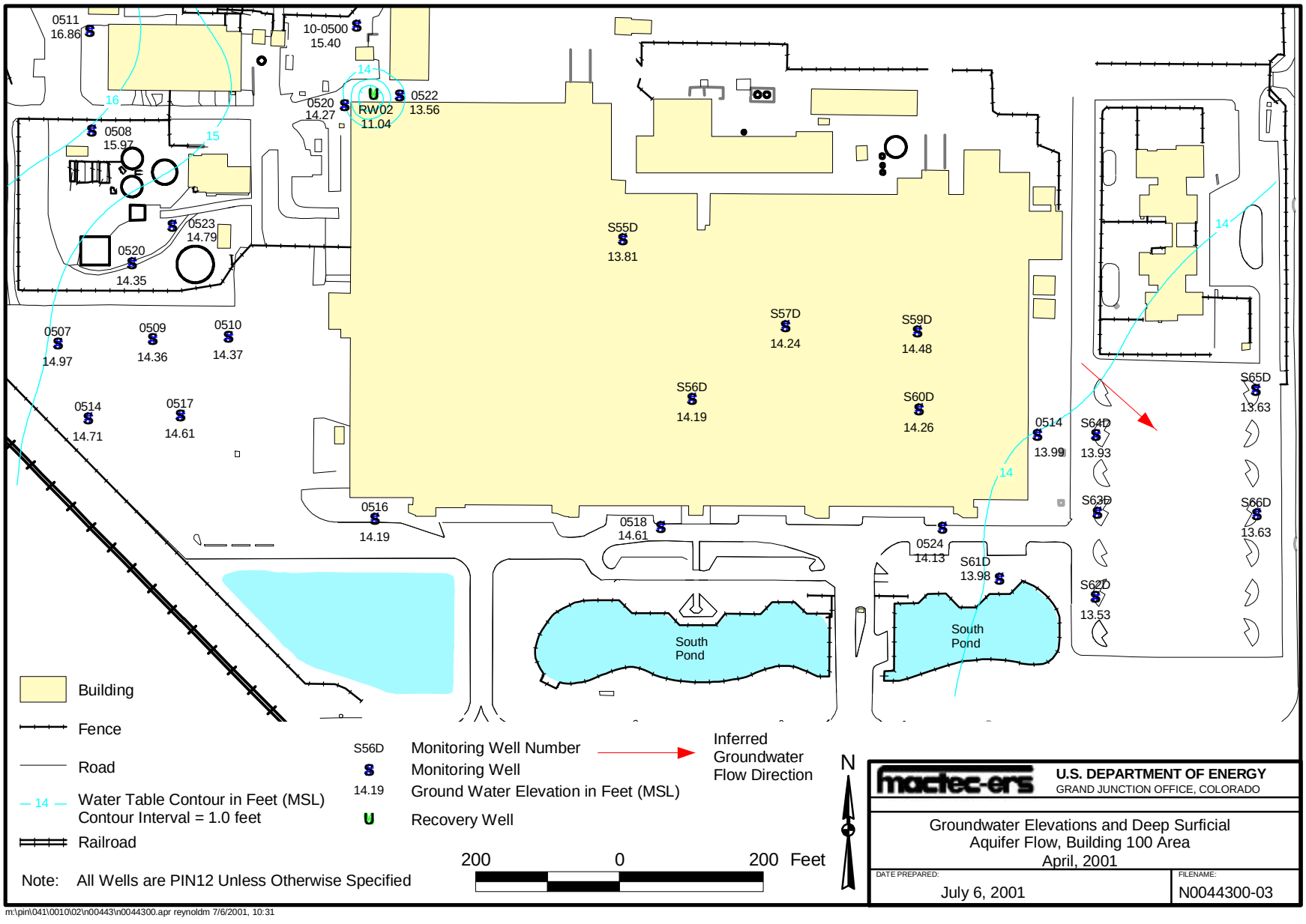

Figure 6. Groundwater Elevations and Deep Surficial Aquifer Flow, Building 100 Area, April 2001

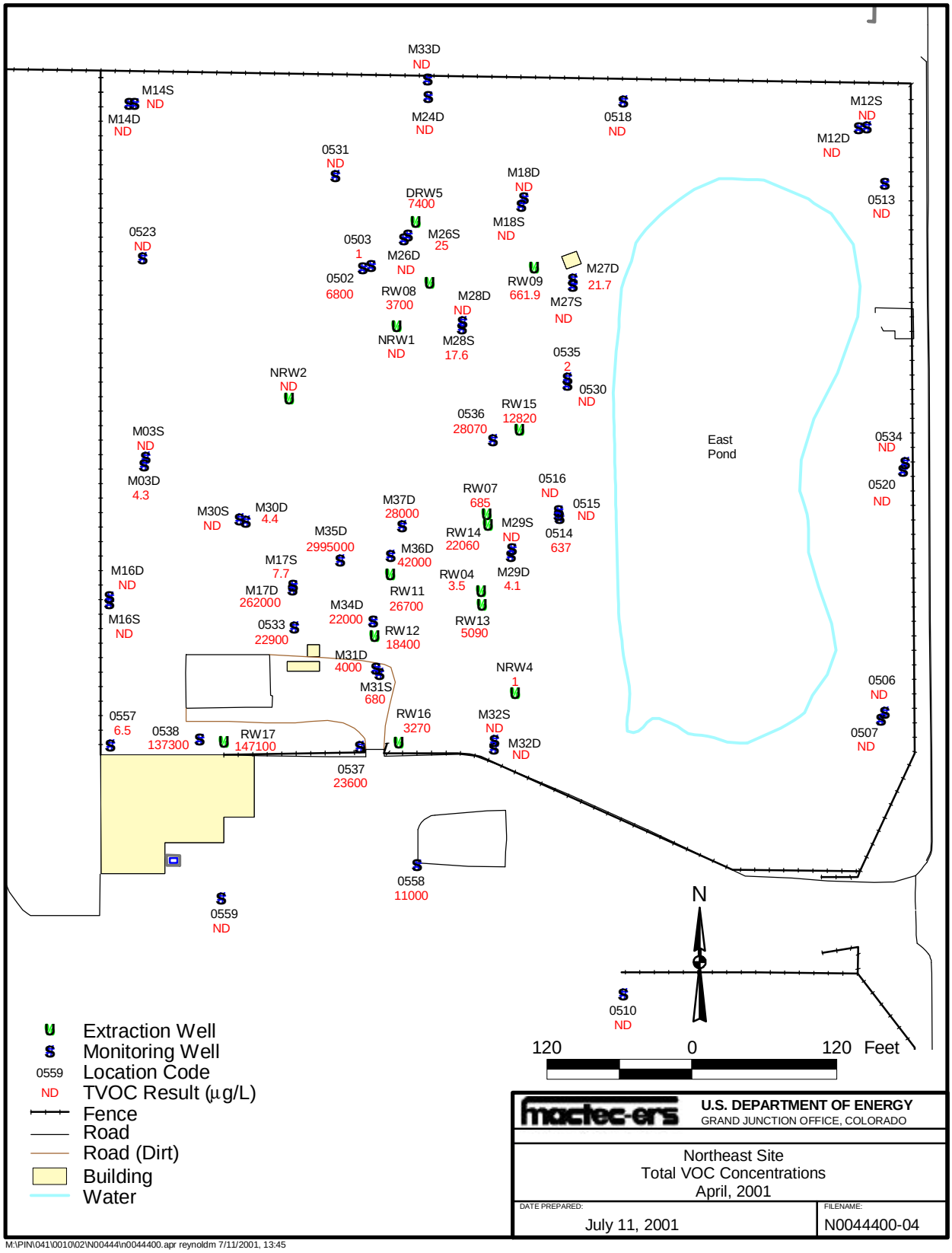

Figure 7. Total VOCs Concentrations at the Northeast Site, April 2001
(wells without VOC values or "NDs" were not sampled during this quarter)

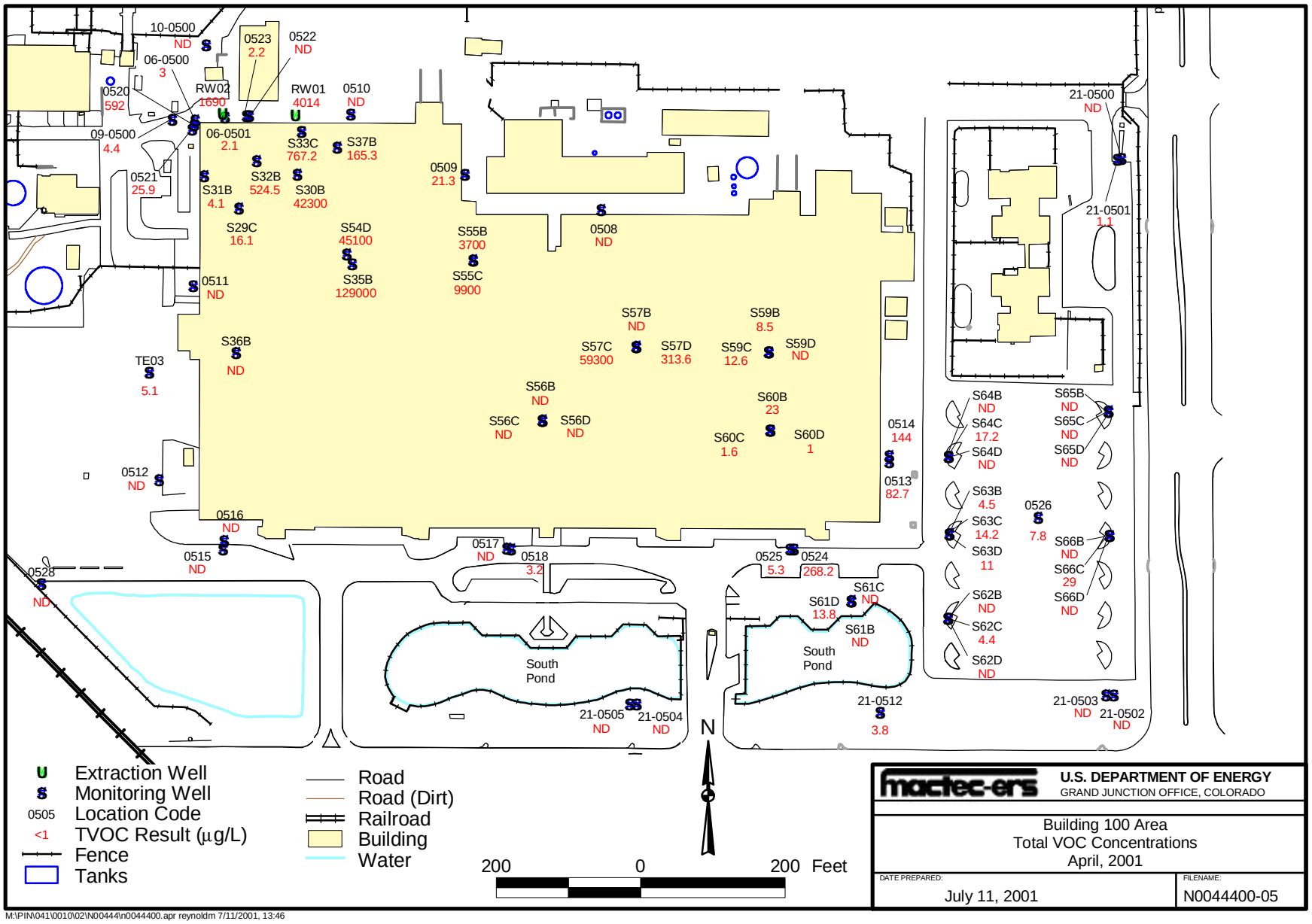

Figure 8. Total VOCs Concentrations at Building 100, April 2001

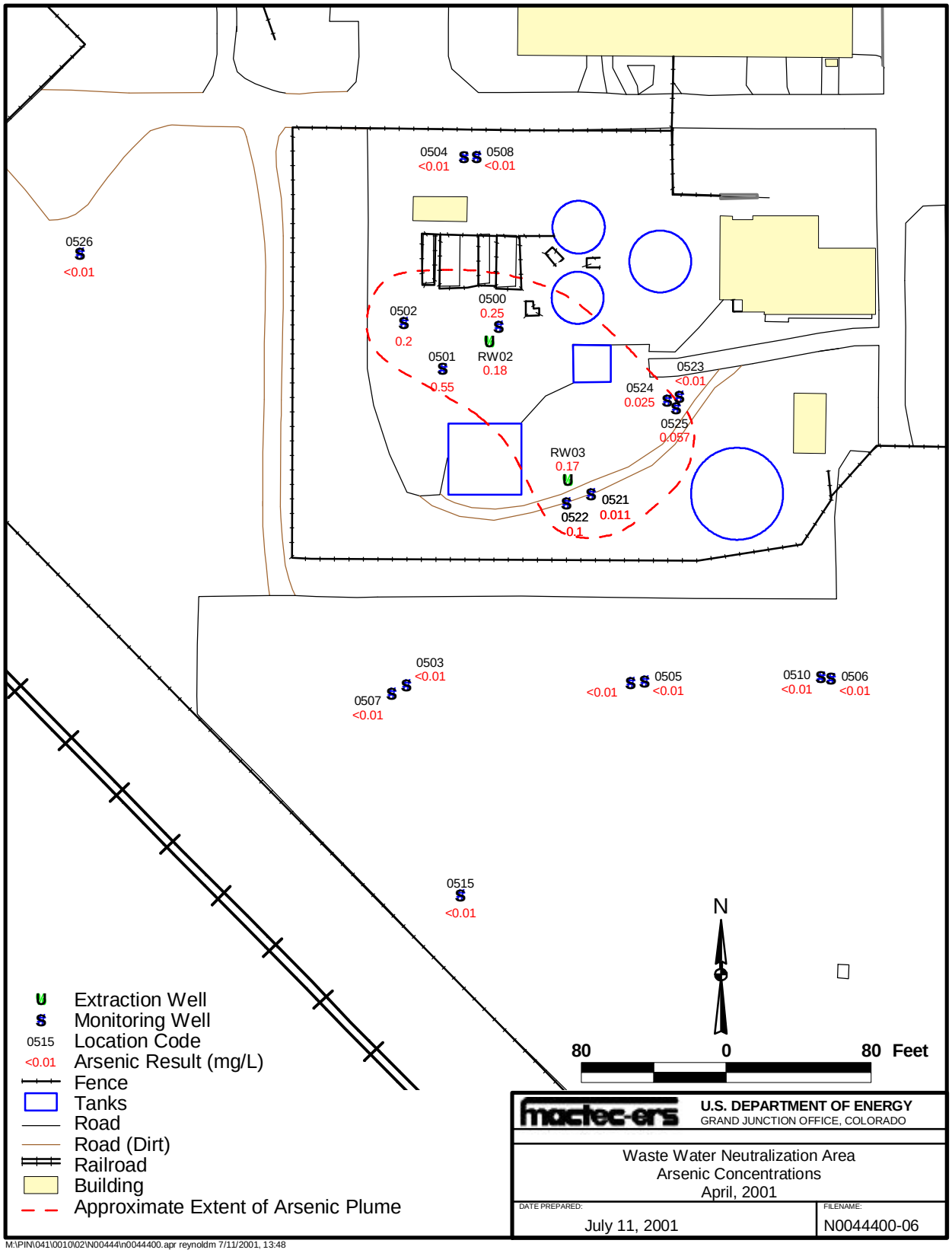

Figure 9. Arsenic Concentrations at the WWNA, April 2001

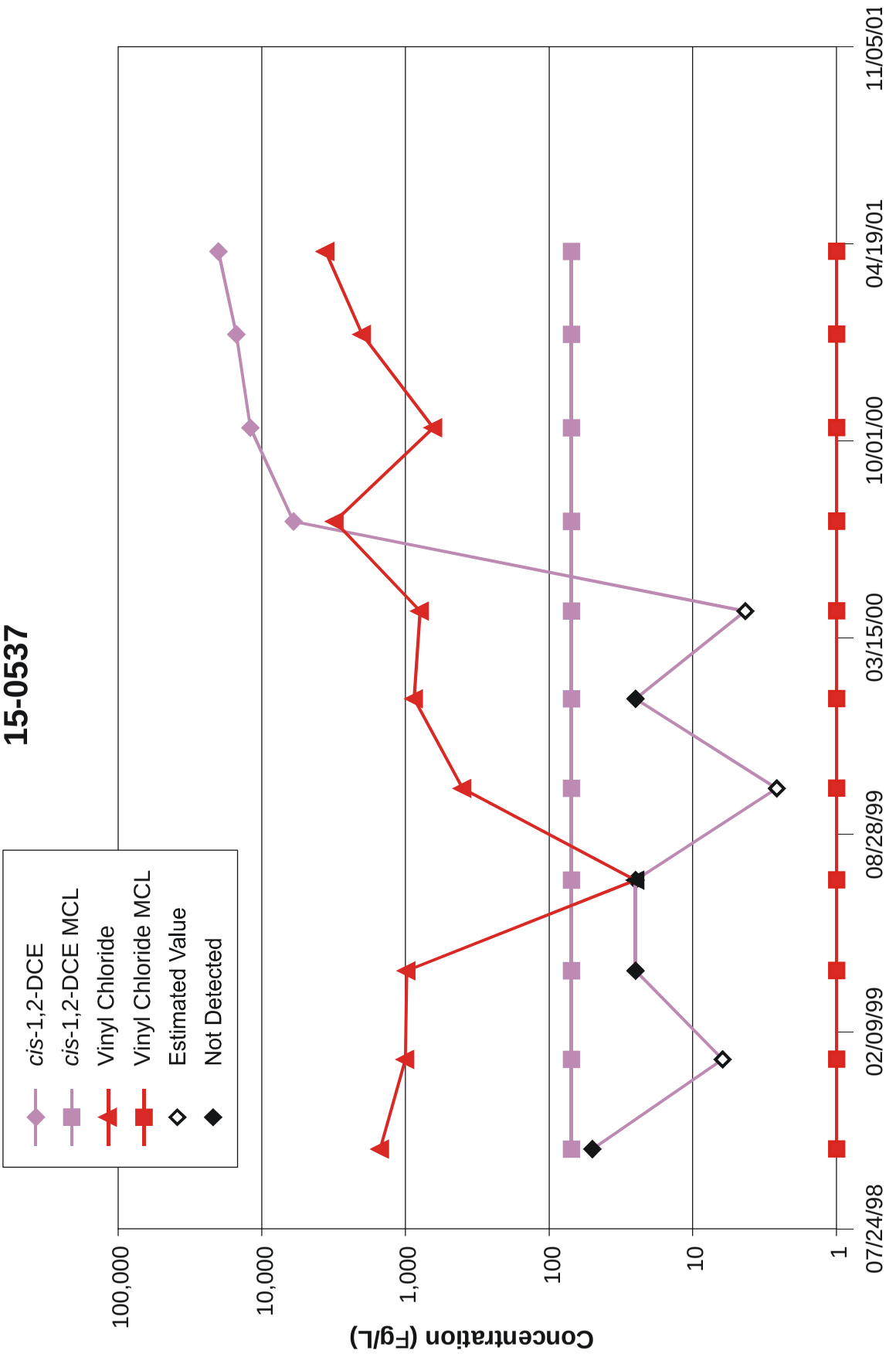

Figure 10. Time Concentration Plot for Monitoring Well PIN15–0537

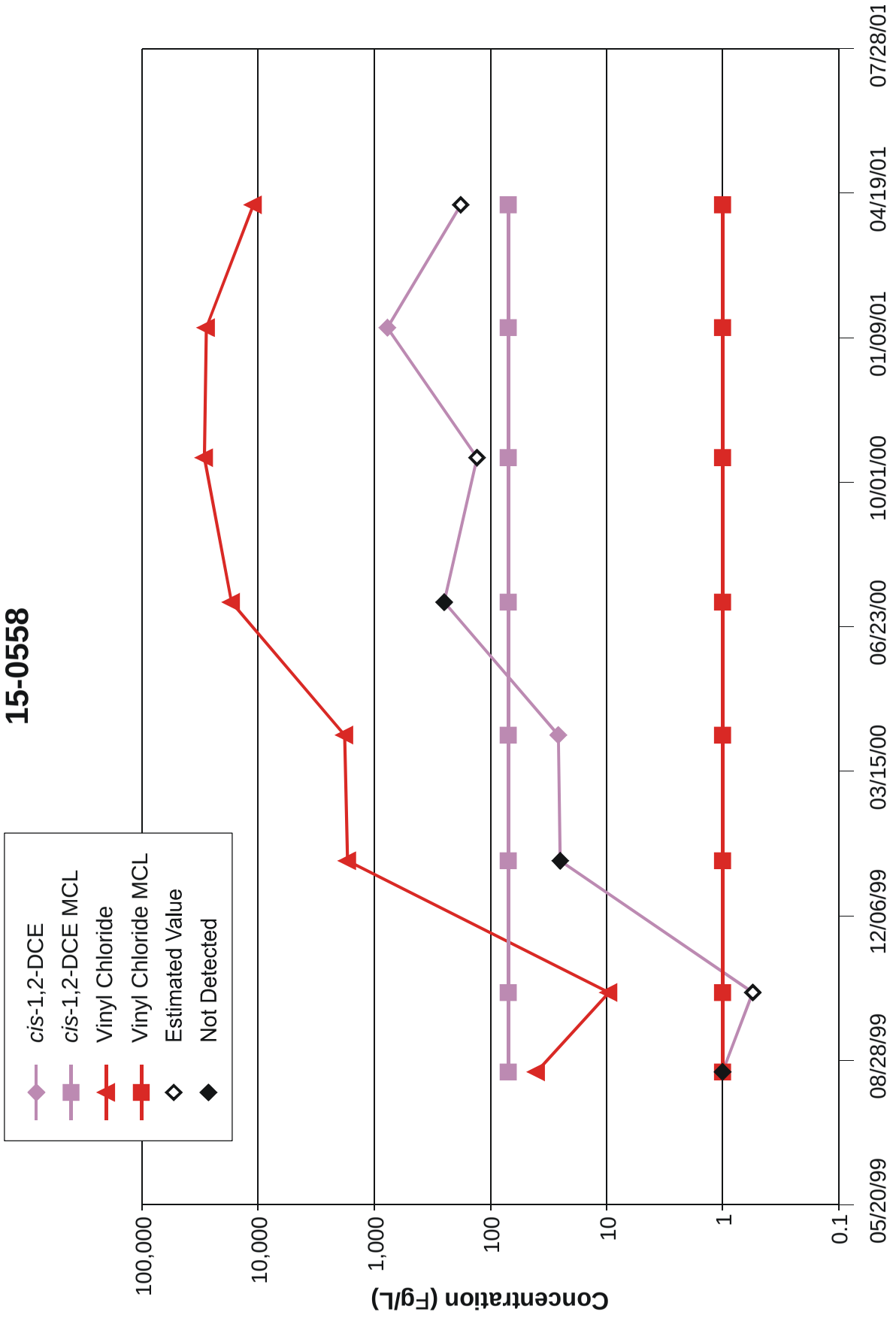

Figure 11. Time Concentration Plot for Well PIN15–0558

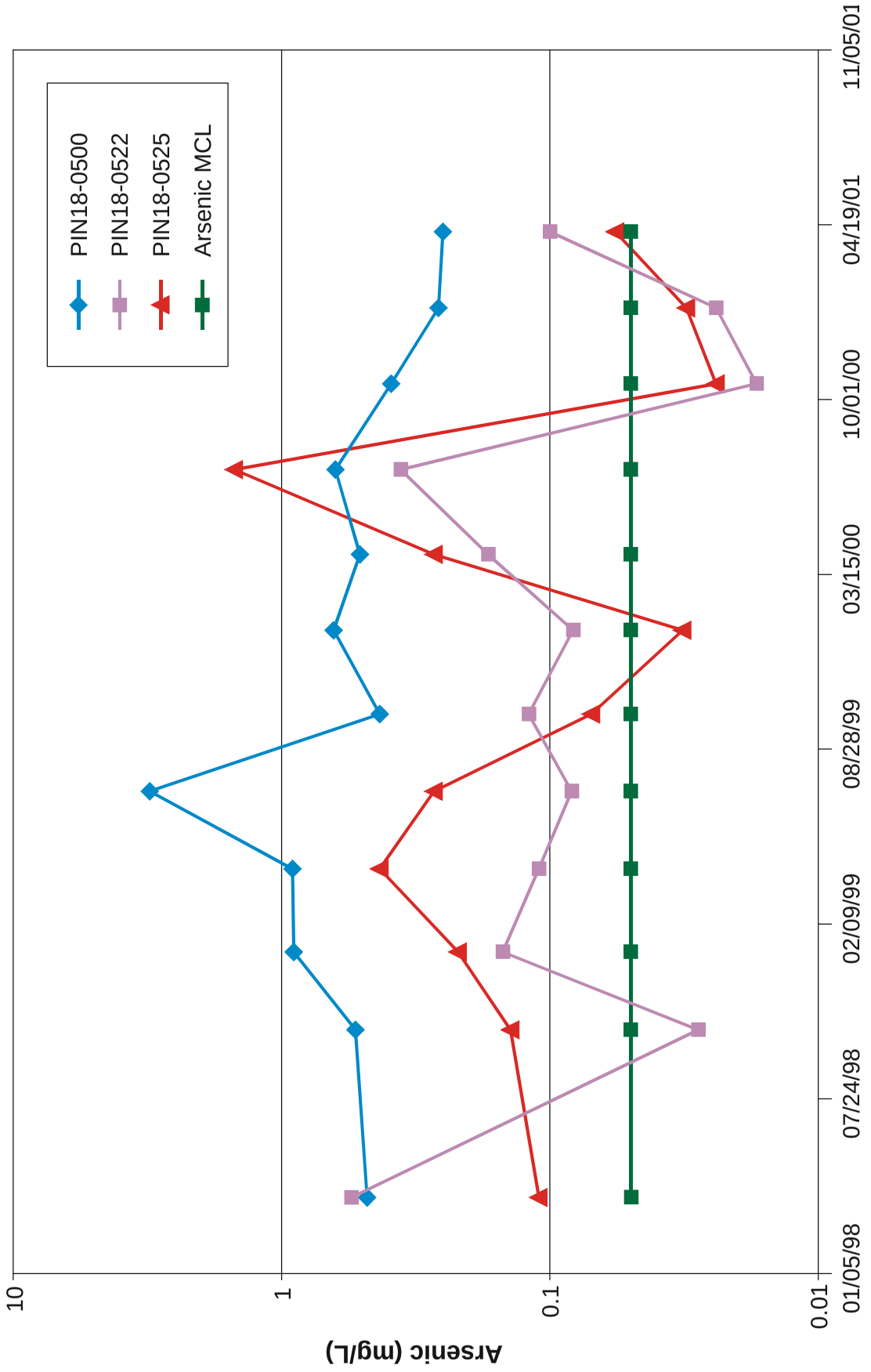

Figure 12. Arsenic Time Concentration Plot

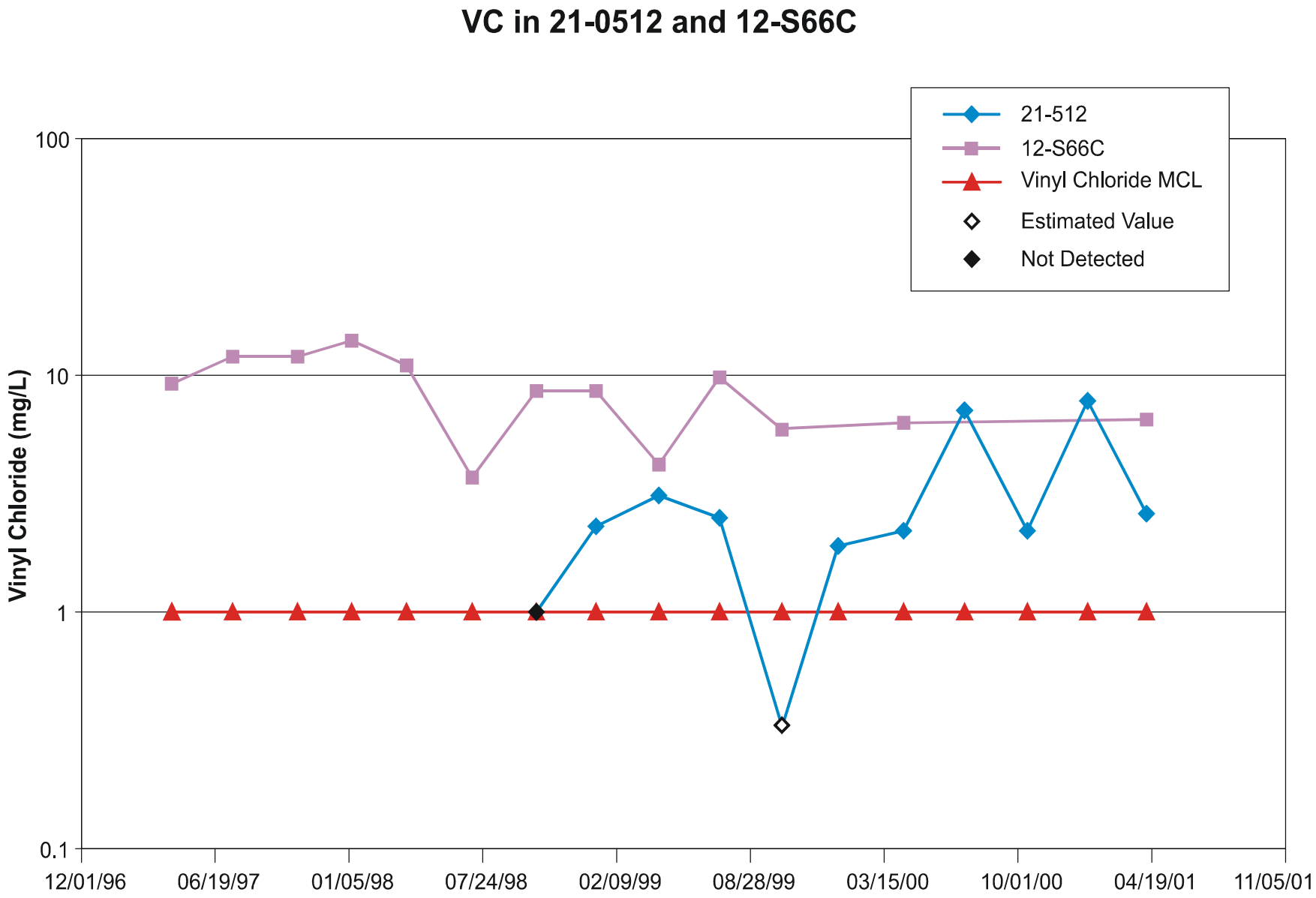

Figure 13. Time Concentration Plot for Vinyl Chloride in Wells PIN21–0512 and PIN12–S66C

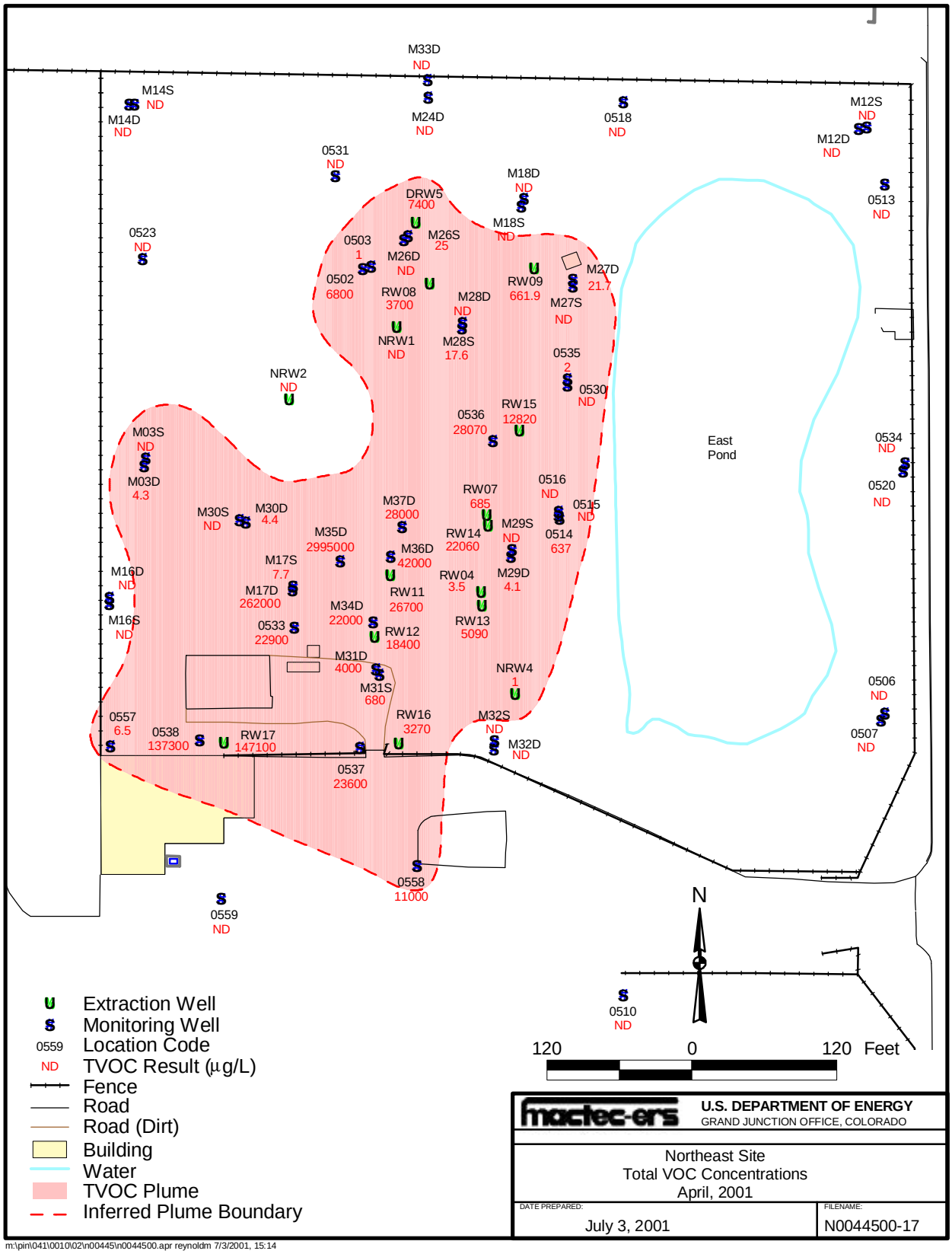

Figure 14. Total VOCs Concentrations, Northeast Site, April 2001

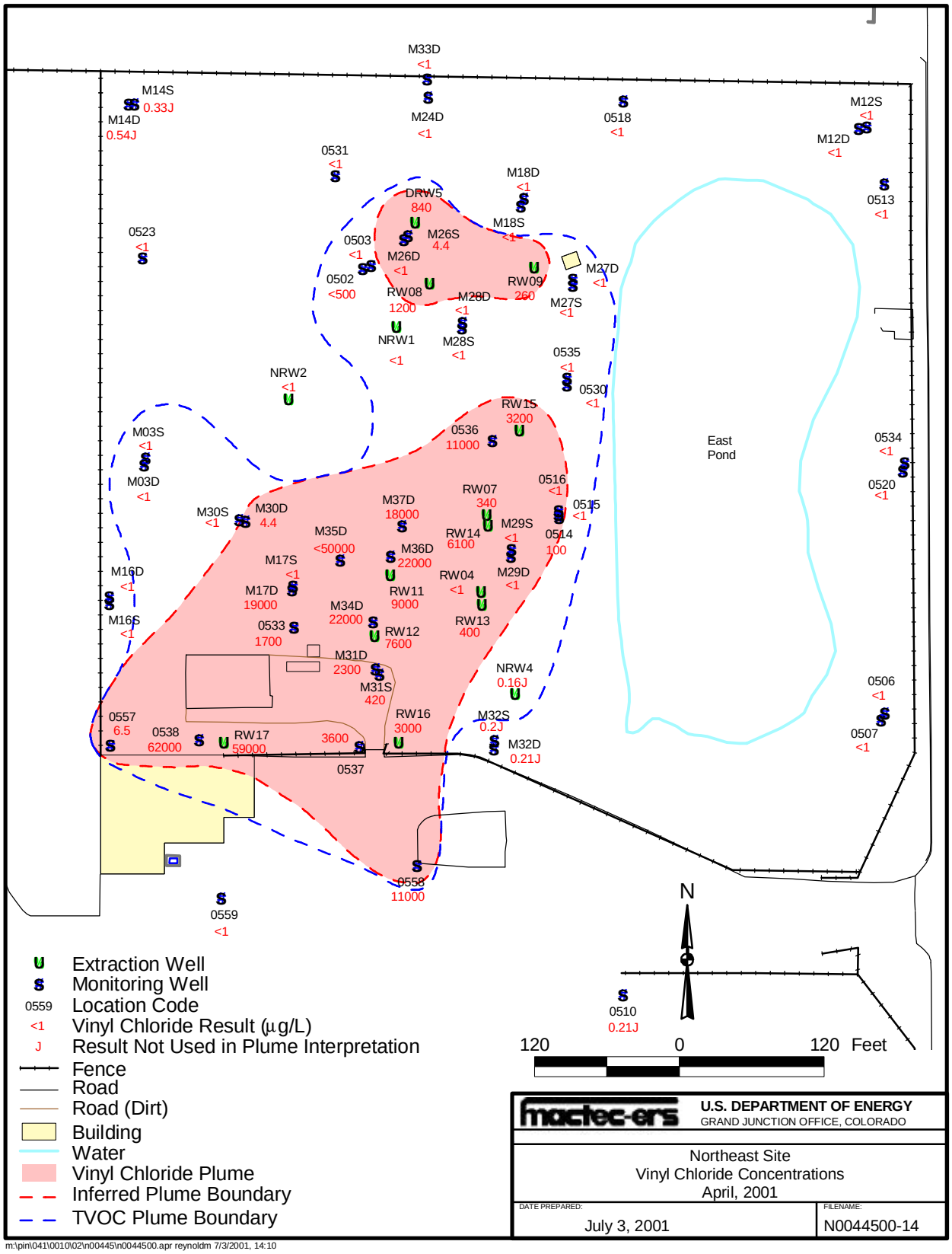

Figure 15. Vinyl Chloride Concentrations, Northeast Site, April 2001

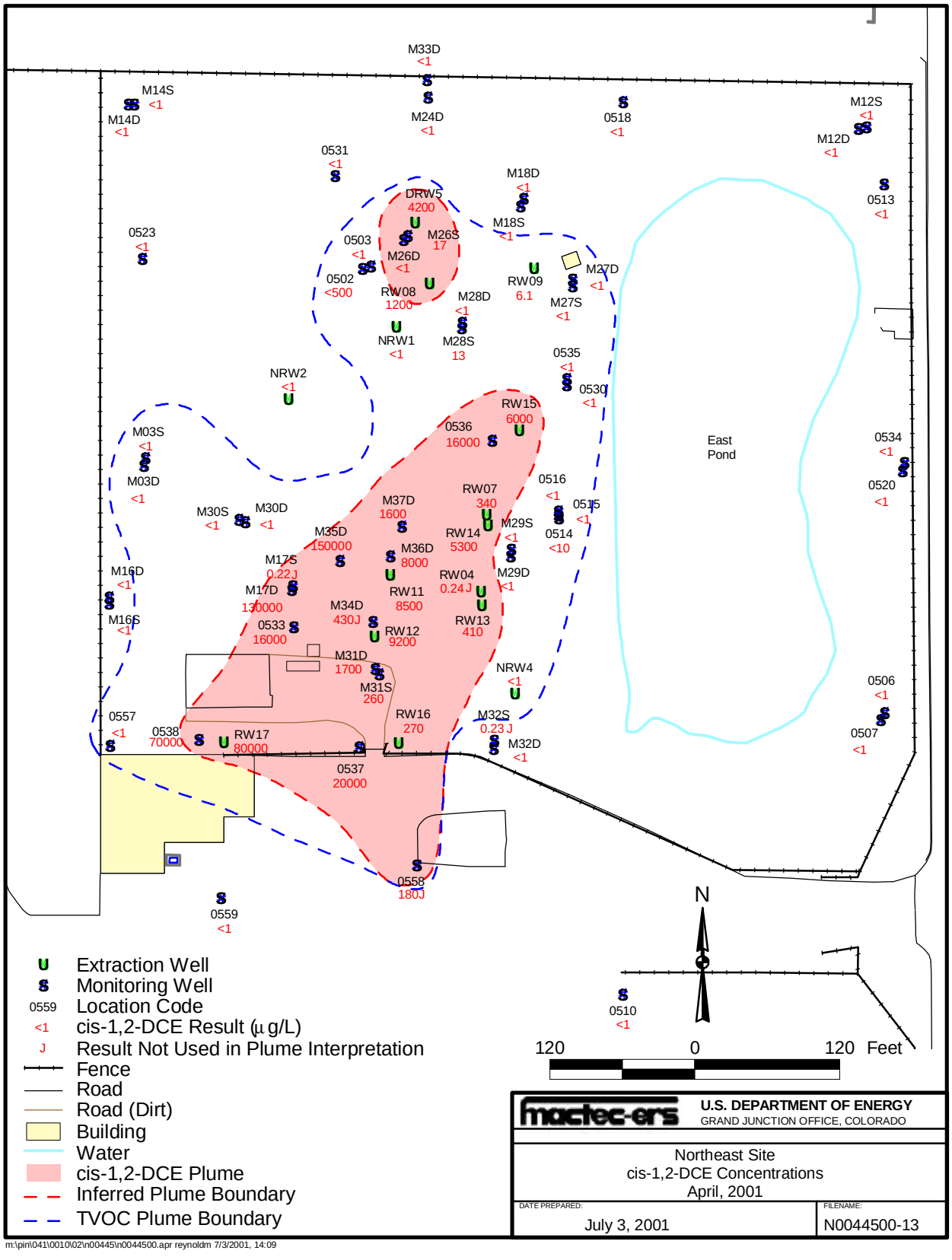

Figure 16. cis-1,2-DCE Concentrations, Northeast Site, April 2001

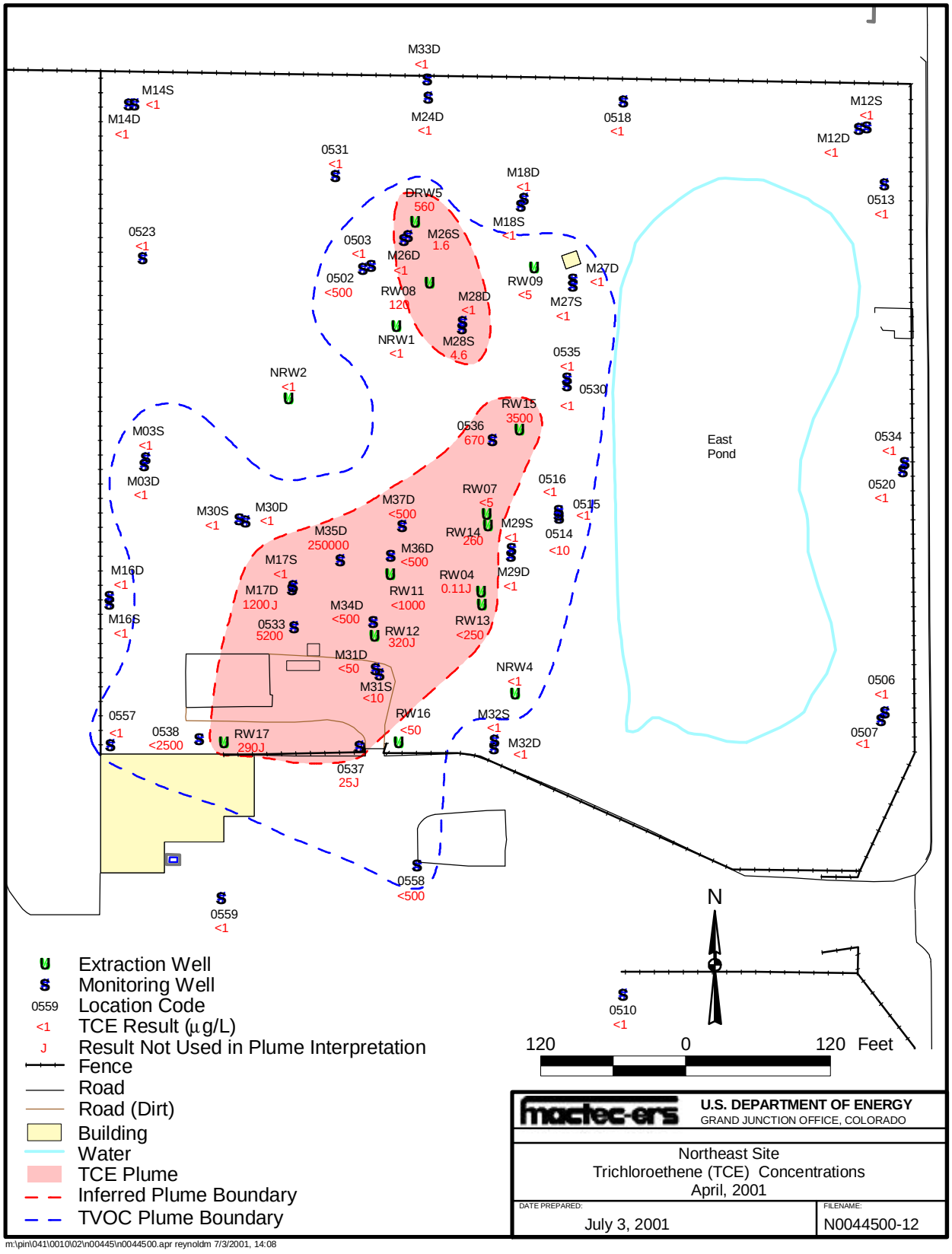

Figure 17. Trichloroethene (TCE) Concentrations, Northeast Site, April 2001

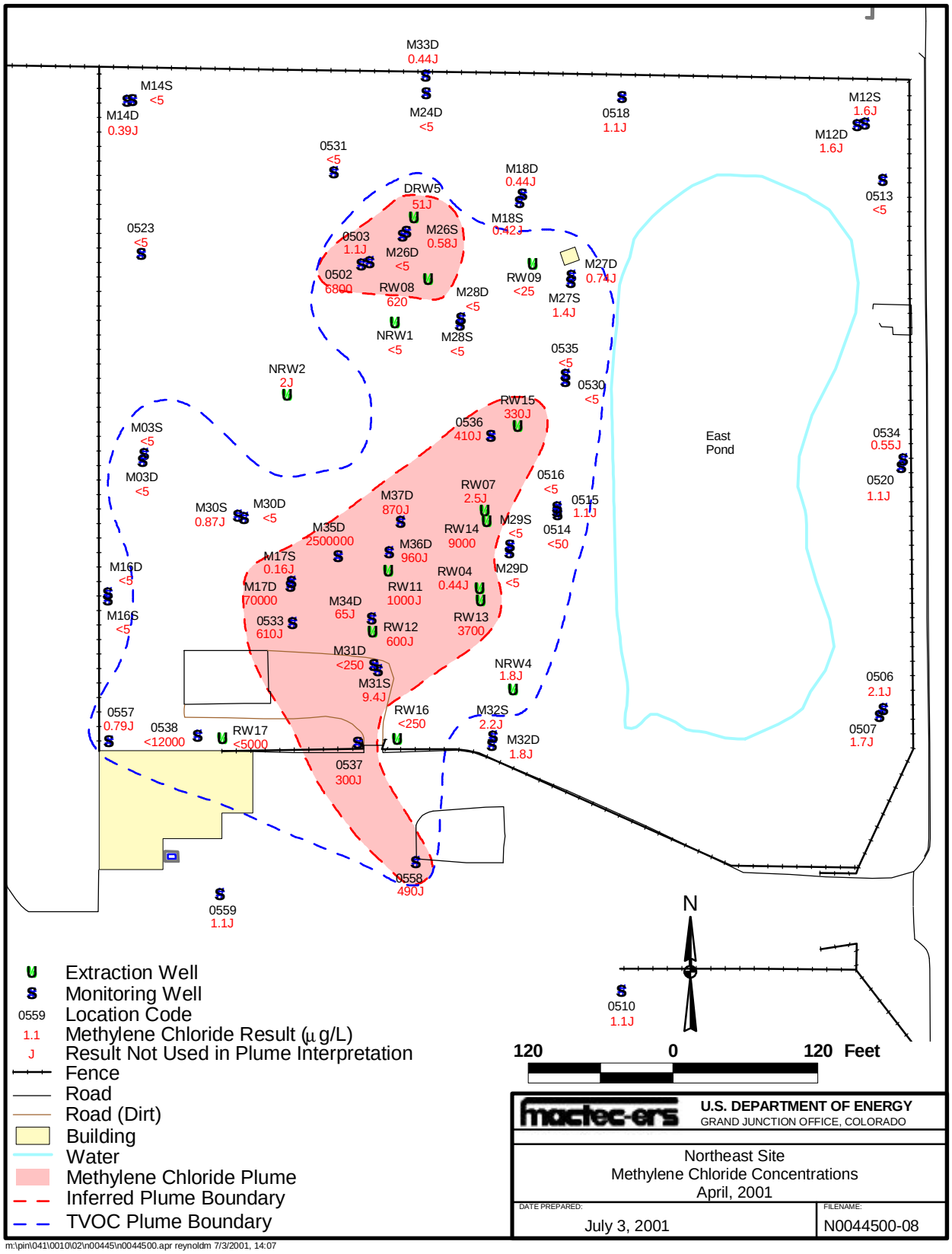

Figure 18. Methylene Chloride Concentrations, Northeast Site, April 2001

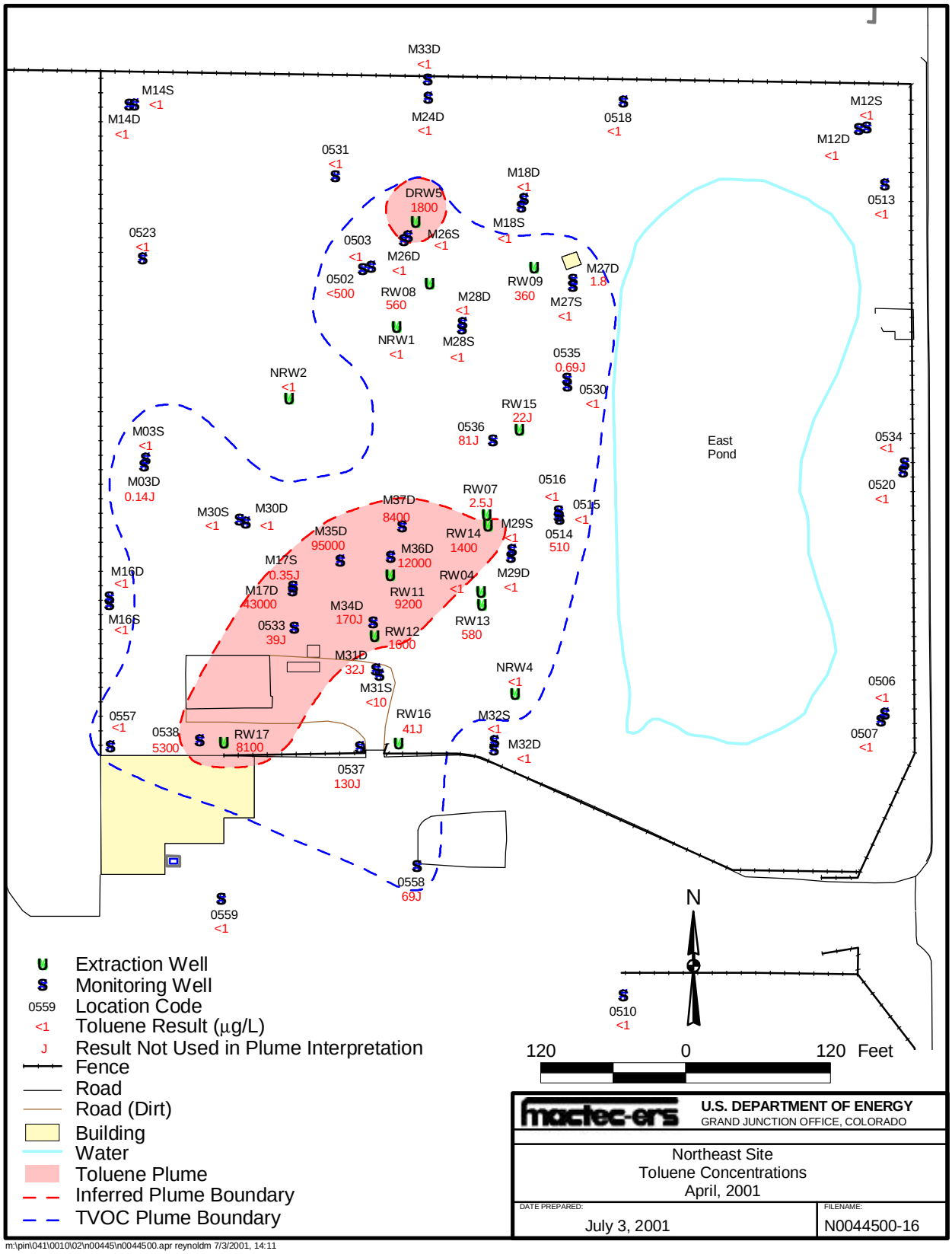

Figure 19. Toluene Concentrations, Northeast Site, April 2001

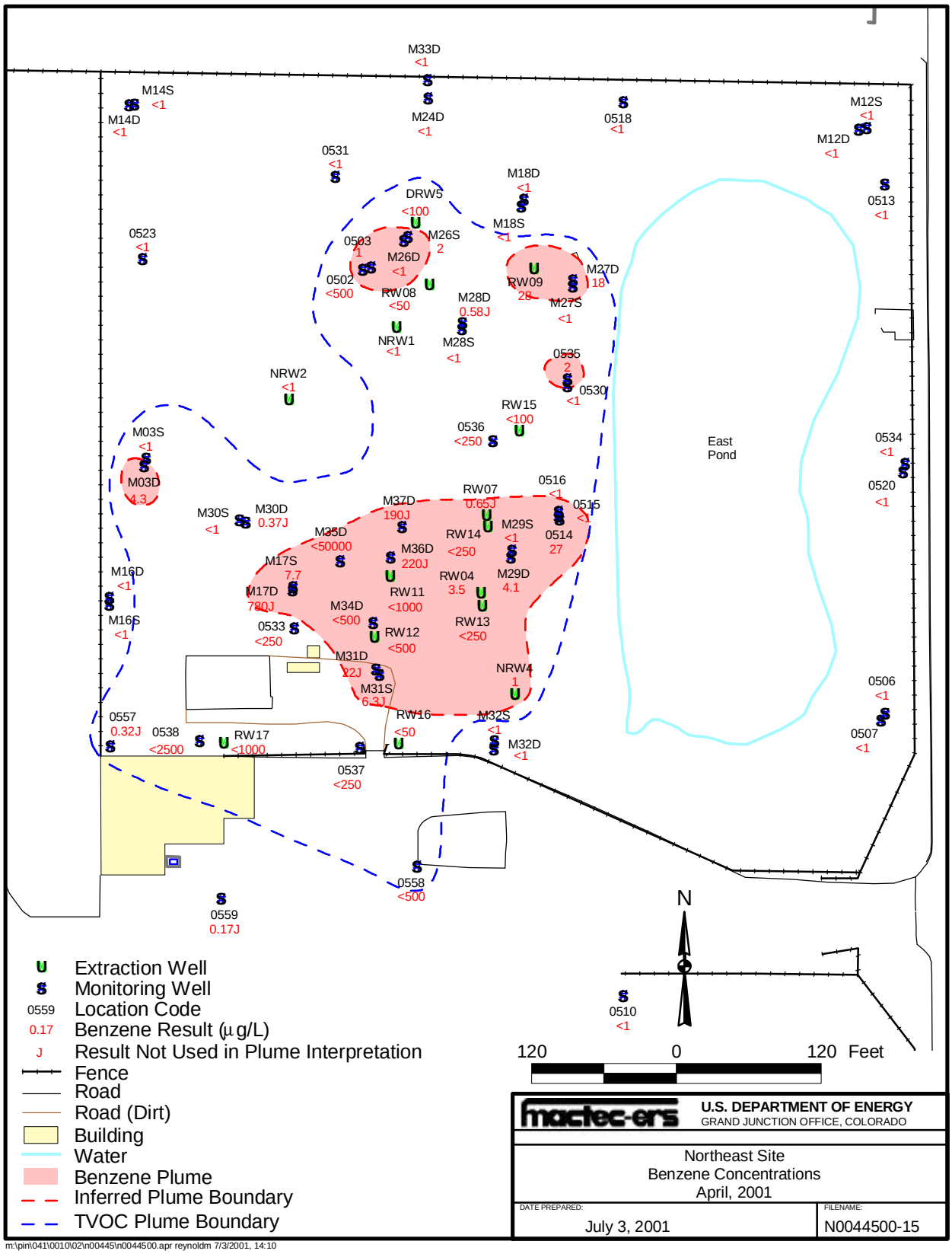

Figure 20. Benzene Concentrations, Northeast Site, April 2001

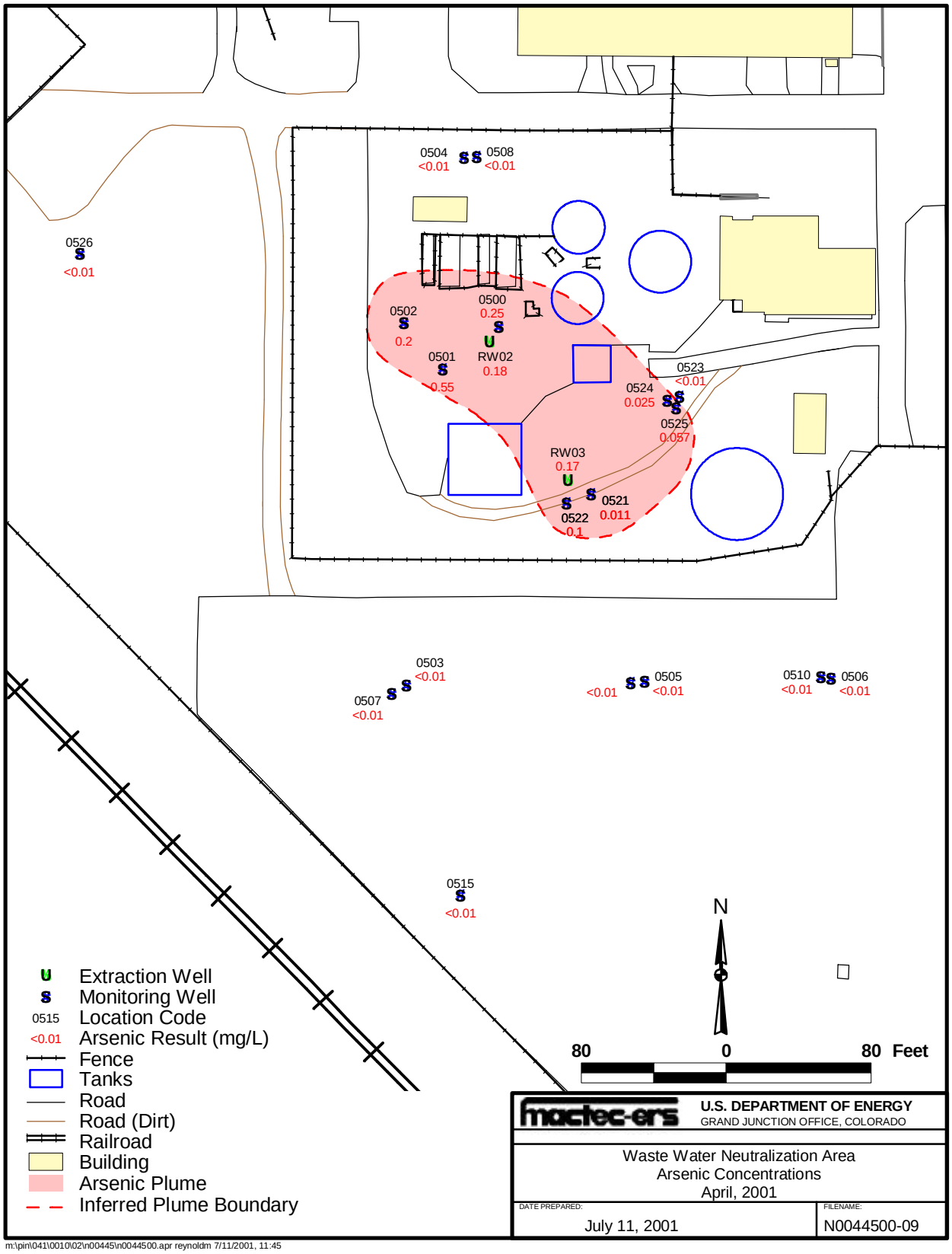

Figure 21. WWNA Arsenic Concentrations, April 2001

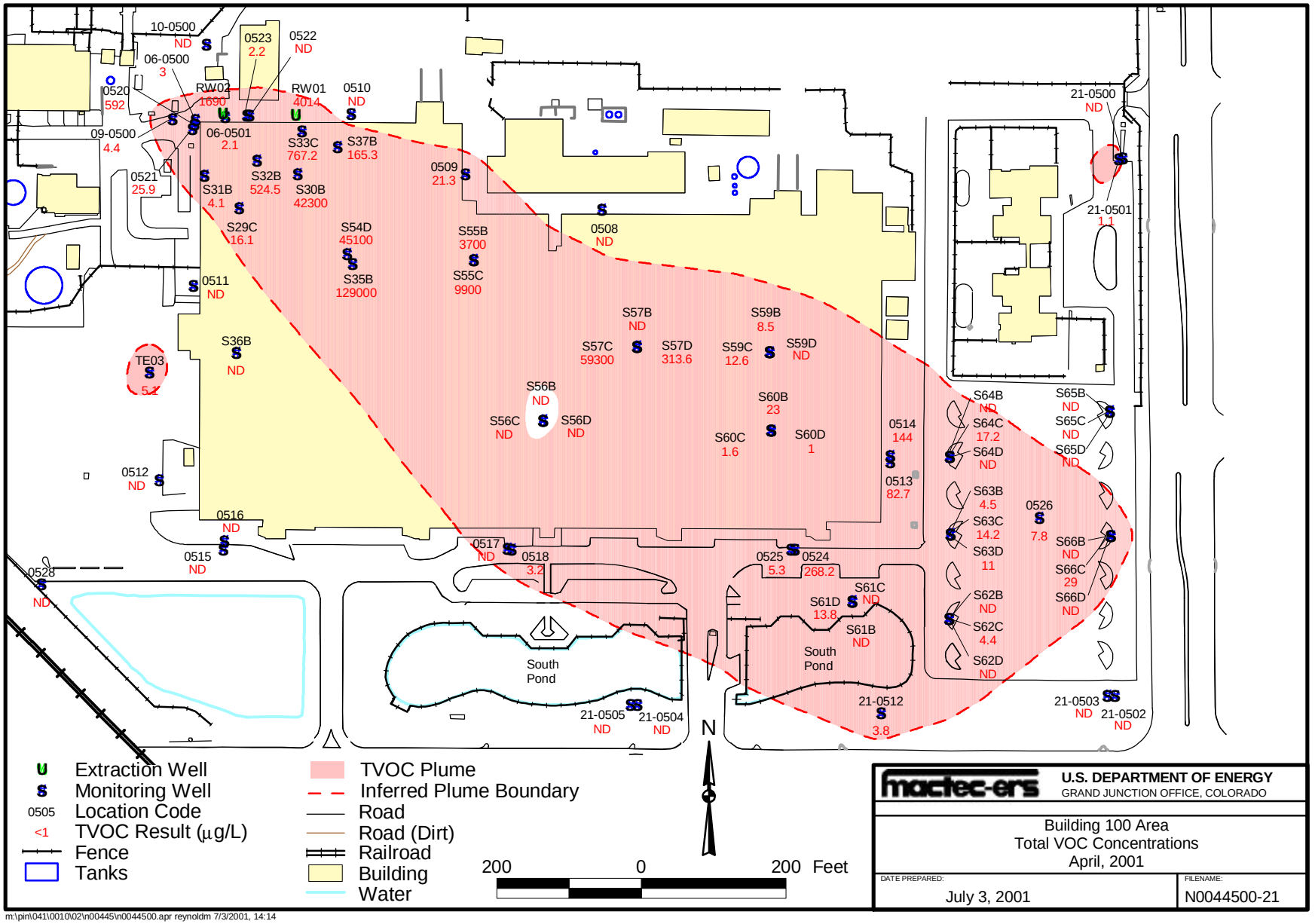

Figure 22. Building 100 Area Total VOCs Concentrations, April 2001

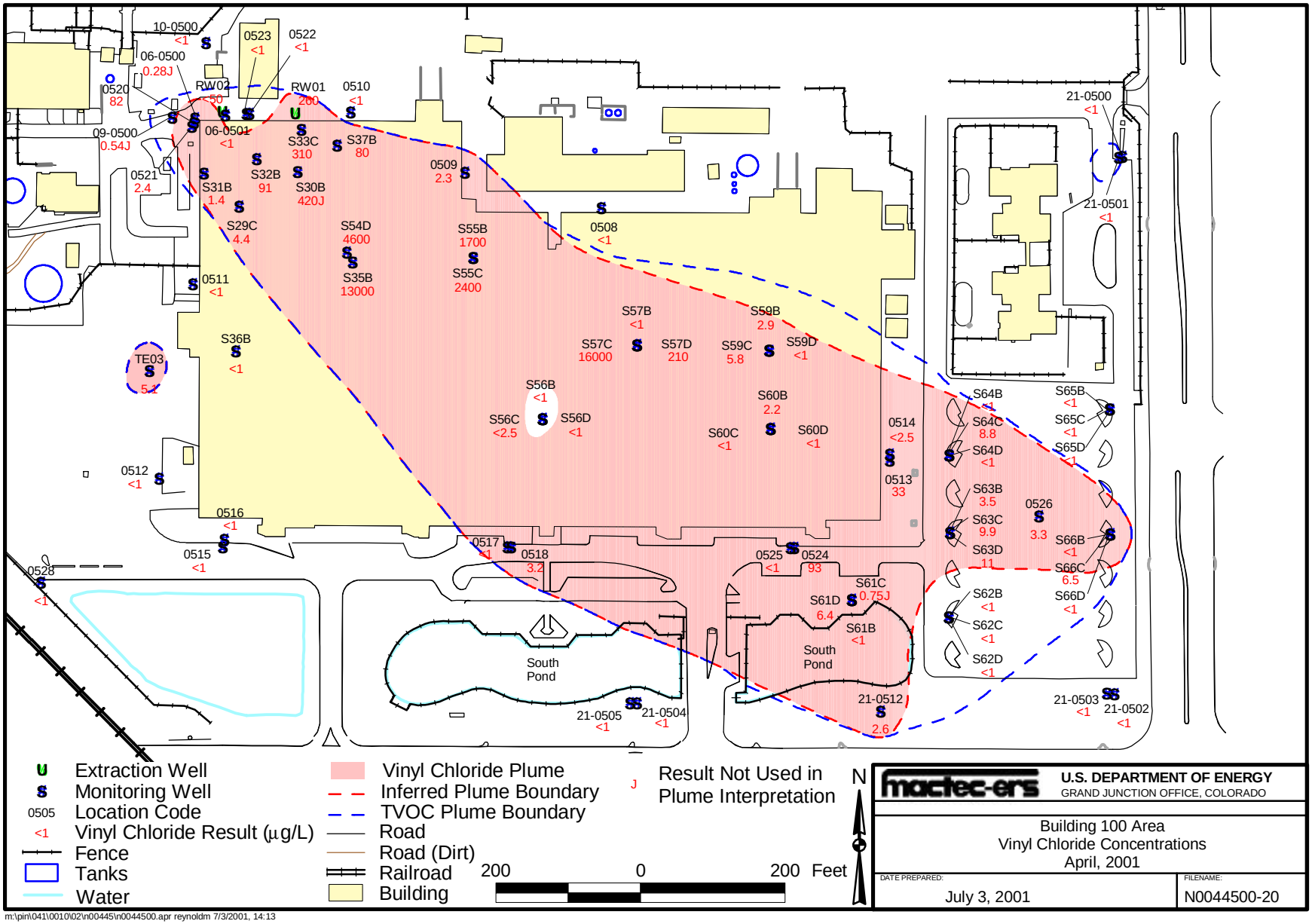

Figure 23. Building 100 Area Vinyl Chloride Concentrations, April 2001

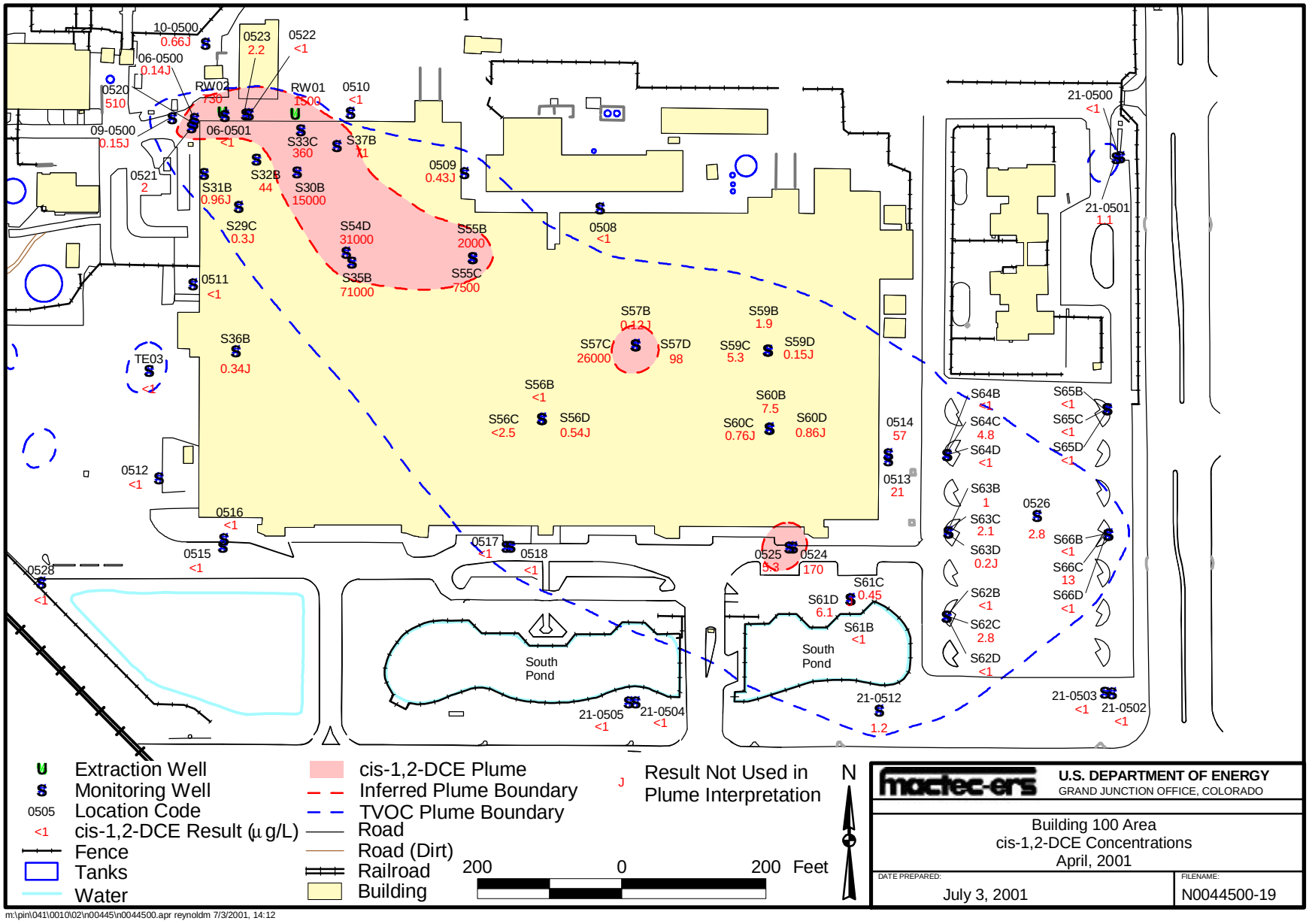

Figure 24. Building 100 Area cis-1,2-DCE Concentrations, April 2001

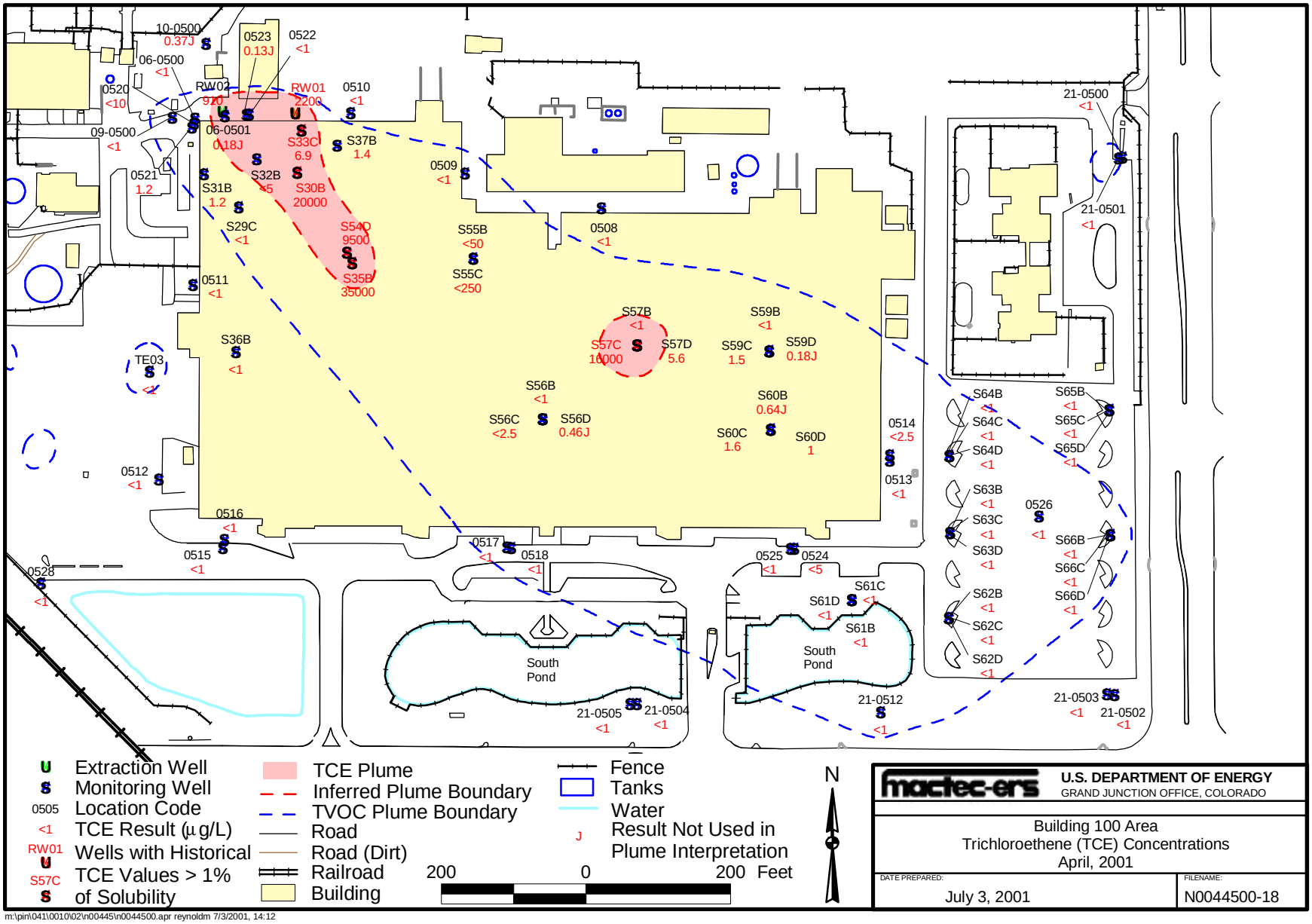

Figure 25. Building 100 Area Trichloroethene (TCE) Concentrations, April 2001

Table 1. WWNA Startup Monitoring Arsenic Concentrations (mg/L)

Sample Date	RW02	RW03	RW02/RW03 combined effluent
02/26/01	0.08	0.1	0.9
02/27/01	0.074	0.1	0.091
02/28/01	0.074	0.091	0.074
03/01/01	0.084	0.096	0.088
03/02/01	0.088	0.095	0.089
03/05/01	0.13	0.22	0.1
03/12/01	0.37	0.11	0.13
03/19/01	0.42	0.12	0.27
03/26/01	0.15	0.16	0.705
04/02/01	0.18	0.12	0.13
04/16/01	0.18	0.17	0.13
05/01/01	0.16	0.07	0.10
05/15/01	0.14	0.15	0.093
05/30/01	0.13	0.07	0.16
06/11/01	0.11	0.068	0.083
06/25/01	0.13	0.067	0.096

Table 2. Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN02	PINELLAS WEST POND							
	502D	O	21.50	04/02/2001	11:15	5.93	15.57	
PIN05	PINELLAS TREVOR SITE							
	0500	O	21.74	04/02/2001	10:56	6.00	15.74	
PIN06	PINELLAS OLD ORM STORAGE SITE							
	0500	O	17.75	04/02/2001	17:09	3.08	14.67	
	0501	O	17.75	04/02/2001	14:56	3.38	14.37	
PIN09	PINELLAS INCINERATOR SITE							
	0500	O	17.48	04/02/2001	17:11	2.63	14.85	
PIN10	PINELLAS INCINERATOR DITCH							
	0500	O	20.74	04/02/2001	17:02	5.34	15.40	
PIN12	INDUSTRIAL DRAIN LEAKS BUILDING 100							
	0508	O	18.13	04/02/2001	17:20	3.77	14.36	
	0509	O	17.52	04/02/2001	17:16	3.50	14.02	
	0510	O	17.74	04/02/2001	16:40	4.02	13.72	
	0511	O	20.29	04/02/2001	13:35	5.99	14.30	
	0512	O	16.56	04/02/2001	14:15	2.11	14.45	
	0513	O	18.20	04/02/2001	15:08	4.26	13.94	
	0514	O	18.34	04/02/2001	15:09	4.35	13.99	
	0515	O	17.71	04/02/2001	16:20	3.73	13.98	
	0516	O	17.65	04/02/2001	16:21	3.46	14.19	
	0517	O	17.68	04/02/2001	14:29	3.05	14.63	
	0518	O	17.71	04/02/2001	14:31	3.10	14.61	
	0520	O	17.26	04/02/2001	17:09	2.99	14.27	
	0521	O	17.80	04/02/2001	17:10	3.56	14.24	
	0522	O	17.92	04/02/2001	16:55	4.36	13.56	
	0523	O	17.90	04/02/2001	16:57	4.41	13.49	
	0524	O	16.76	04/02/2001	15:04	2.63	14.13	
	0525	O	17.10	04/02/2001	15:03	3.29	13.81	
	0526	0	16.50	04/02/2001	15:52	2.71	13.79	
	0527	O	20.57	04/02/2001	12:00	13.04	7.53	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN12	INDUSTRIAL DRAIN LEAKS BUILDING 100							
	0528	O	20.17	04/02/2001	14:21	12.69	7.48	
	RW01	O	16.75	04/02/2001	14:47	15.90	0.85	
	RW02	O	17.11	04/03/2001	11:29	6.07	11.04	
	S29C	O	18.24	04/02/2001	15:10	4.38	13.86	
	S30B	O	18.26	04/02/2001	14:12	4.65	13.61	
	S31B	O	18.30	04/02/2001	13:53	4.11	14.19	
	S32B	O	18.19	04/02/2001	13:58	4.33	13.86	
	S33C	O	18.28	04/02/2001	14:02	4.82	13.46	
	S35B	O	18.30	04/02/2001	14:32	4.70	13.60	
	S36B	O	18.26	04/02/2001	13:48	4.17	14.09	
	S37B	O	18.29	04/02/2001	14:06	4.74	13.55	
	S54D	O	18.38	04/02/2001	14:26	4.19	14.19	
	S55B	O	18.35	04/02/2001	16:24	4.48	13.87	
	S55C	O	18.38	04/02/2001	16:25	4.36	14.02	
	S55D	O	18.28	04/02/2001	16:26	4.47	13.81	
	S56B	O	18.30	04/02/2001	16:29	4.03	14.27	
	S56C	O	18.30	04/02/2001	16:30	4.02	14.28	
	S56D	O	18.33	04/02/2001	16:31	4.14	14.19	
	S57B	O	18.17	04/02/2001	16:35	3.94	14.23	
	S57C	O	18.28	04/02/2001	16:36	4.01	14.27	
	S57D	O	18.27	04/02/2001	16:37	4.03	14.24	
	S59B	O	18.29	04/02/2001	15:43	3.55	14.74	
	S59C	O	18.30	04/02/2001	15:44	3.86	14.44	
	S59D	O	18.29	04/02/2001	15:46	3.81	14.48	
	S60B	O	18.33	04/02/2001	15:37	3.52	14.81	
	S60C	O	18.33	04/02/2001	15:39	4.06	14.27	
	S60D	O	18.35	04/02/2001	15:40	4.09	14.26	
	S61B	O	17.80	04/02/2001	14:53	3.23	14.57	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN12	INDUSTRIAL DRAIN LEAKS BUILDING 100							
	S61C	O	17.79	04/02/2001	14:55	3.78	14.01	
	S61D	O	17.83	04/02/2001	14:56	3.85	13.98	
	S62B	O	15.72	04/02/2001	15:30	1.60	14.12	
	S62C	O	15.70	04/02/2001	15:26	1.80	13.90	
	S62D	O	15.68	04/02/2001	15:31	2.15	13.53	
	S63B	O	16.45	04/02/2001	15:37	2.19	14.26	
	S63C	O	16.41	04/02/2001	15:39	2.21	14.20	
	S64B	O	17.76	04/02/2001	15:45	3.96	13.80	
	S64C	O	17.77	04/02/2001	15:48	3.81	13.96	
	S64D	O	17.74	04/02/2001	15:50	3.81	13.93	
	S65B	O	17.69	04/02/2001	15:56	4.04	13.65	
	S65C	O	17.66	04/02/2001	15:58	4.60	13.06	
	S65D	O	17.66	04/02/2001	16:00	4.03	13.63	
	S66B	O	16.26	04/02/2001	17:45	2.74	13.52	
	S66C	O	16.22	04/02/2001	17:46	2.94	13.28	
	S66D	O	16.20	04/02/2001	17:47	2.57	13.63	
	TE03	O	16.72	04/02/2001	13:38	2.36	14.36	
PIN15	PINELLAS NORTHEAST SITE							
	0502	O	20.65	04/02/2001	11:04	9.69	10.96	
	0503	O	20.75	04/02/2001	11:03	10.03	10.72	
	0506	O	19.65	04/02/2001	10:32	5.20	14.45	
	0507	O	19.27	04/02/2001	10:33	4.86	14.41	
	0510	O	17.07	04/02/2001	12:09	2.80	14.27	
	0513	O	20.78	04/02/2001	10:25	13.40	7.38	
	0514	O	19.50	04/02/2001	09:55	8.38	11.12	
	0515	O	19.44	04/02/2001	09:57	8.34	11.10	
	0516	O	18.93	04/02/2001	10:01	6.19	12.74	
	0518	O	19.60	04/02/2001	10:19	7.17	12.43	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN15 PINELLAS NORTHEAST SITE							
0520	O	19.56	04/02/2001	10:30	5.24	14.32	
0523	O	20.33	04/02/2001	10:50	6.70	13.63	
0530	O	19.53	04/02/2001	10:09	7.94	11.59	
0531	O	20.15	04/02/2001	10:54	8.34	11.81	
0533	O	21.03	04/02/2001	11:36	8.61	12.42	
0534	O	20.15	04/02/2001	10:29	6.47	13.68	
0535	O	20.16	04/02/2001	10:14	9.76	10.40	
0536	O	19.86	04/02/2001	10:06	10.37	9.49	
0537	O	21.28	04/02/2001	10:39	9.35	11.93	
0538	O	21.26	04/02/2001	10:43	7.89	13.37	
0557	O	22.33	04/02/2001	10:45	7.81	14.52	
0558	O	18.04	04/02/2001	12:03	4.36	13.68	
0559	O	18.59	04/02/2001	11:56	4.46	14.13	
B002	O	19.45	04/02/2001	11:05	8.63	10.82	
B003	O	18.90	04/02/2001	11:17	7.96	10.94	
B004	O	20.10	04/02/2001	11:27	9.30	10.80	
B005	O	19.55	04/02/2001	11:25	8.80	10.75	
DRW5	O	17.85	04/02/2001	10:58	13.48	4.37	
M03D	O	21.08	04/02/2001	10:48	7.10	13.98	
M03S	O	20.58	04/02/2001	10:48	6.47	14.11	
M12D	O	19.90	04/02/2001	10:22	5.90	14.00	
M12S	O	19.85	04/02/2001	10:23	5.77	14.08	
M14D	O	20.45	04/02/2001	10:57	6.23	14.22	
M14S	O	20.39	04/02/2001	10:51	6.00	14.39	
M16D	O	20.86	04/02/2001	10:47	6.60	14.26	
M16S	O	20.60	04/02/2001	10:46	6.30	14.30	
M17D	O	20.50	04/02/2001	11:33	7.91	12.59	
M17S	O	20.17	04/02/2001	11:33	7.15	13.02	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN15	PINELLAS NORTHEAST SITE							
	M18D	O	20.02	04/02/2001	11:10	8.96	11.06	
	M18S	O	19.58	04/02/2001	11:18	8.87	10.71	
	M24D	O	20.01	04/02/2001	10:57	9.18	10.83	
	M26D	O	20.38	04/02/2001	11:04	10.09	10.29	
	M26S	O	20.00	04/02/2001	10:59	9.63	10.37	
	M27D	O	20.38	04/02/2001	10:19	10.14	10.24	
	M27S	O	20.35	04/02/2001	10:17	7.55	12.80	
	M28D	O	19.92	04/02/2001	11:26	9.90	10.02	
	M28S	O	20.11	04/02/2001	11:20	9.23	10.88	
	M29D	O	20.03	04/02/2001	09:45	10.62	9.41	
	M29S	O	20.35	04/02/2001	09:47	8.58	11.77	
	M30D	O	20.23	04/02/2001	11:31	6.70	13.53	
	M30S	O	20.15	04/02/2001	11:31	6.52	13.63	
	M31D	O	20.35	04/02/2001	11:52	9.51	10.84	
	M31S	O	20.07	04/02/2001	11:52	8.97	11.10	
	M32D	O	20.49	04/02/2001	09:31	7.70	12.79	
	M32S	O	20.13	04/02/2001	09:34	7.28	12.85	
	M33D	B	19.97	04/02/2001	10:57	4.10	15.87	
	M34D	O	20.86	04/02/2001	11:49	10.88	9.98	
	M35D	O	21.01	04/02/2001	11:45	9.98	11.03	
	M36D	O	20.77	04/02/2001	11:47	10.62	10.15	
	M37D	O	21.05	04/02/2001	11:40	10.71	10.34	
	NRW1	O	18.16	04/02/2001	11:29	7.84	10.32	
	NRW2	O	17.60	04/02/2001	11:20	5.90	11.70	
	NRW4	O	20.18	04/02/2001	09:36	7.59	12.59	
	RW03	O	19.65	04/02/2001	11:45	8.65	11.00	
	RW04	O	19.63	04/02/2001	09:39	9.76	9.87	
	RW06	O	19.91	04/02/2001	11:37	8.40	11.51	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN15	PINELLAS NORTHEAST SITE							
	RW07	O	19.45	04/02/2001	09:40	10.06	9.39	
	RW08	O	20.93	04/02/2001	11:14	16.46	4.47	
	RW09	O	20.29	04/02/2001	11:21	20.30	-0.01	
	RW10	O	20.53	04/02/2001	11:38	10.20	10.33	
	RW11	O	21.23	04/02/2001	11:46	10.90	10.33	
	RW12	O	19.64	04/02/2001	11:50	11.33	8.31	
	RW13	O	18.62	04/02/2001	09:38	11.59	7.03	
	RW14	O	20.00	04/02/2001	09:48	14.48	5.52	
	RW15	O	19.43	04/02/2001	10:04	14.57	4.86	
	RW16	O	20.11	04/02/2001	09:30	21.74	-1.63	
	RW17	O	20.88	04/02/2001	10:42	32.33	-11.45	
PIN18	WASTEWATER NEUTRALIZATION AREA							
	0500	O	21.97	04/02/2001	11:34	8.29	13.68	
	0501	O	21.78	04/02/2001	11:37	7.08	14.70	
	0502	O	21.62	04/02/2001	11:39	6.15	15.47	
	0503	O	17.44	04/02/2001	13:53	2.58	14.86	
	0504	O	19.54	04/02/2001	11:30	3.28	16.26	
	0505	O	17.53	04/02/2001	16:24	3.15	14.38	
	0506	O	17.44	04/02/2001	13:42	2.96	14.48	
	0507	O	17.31	04/02/2001	16:26	2.34	14.97	
	0508	O	19.20	04/02/2001	11:32	3.23	15.97	
	0509	O	17.51	04/02/2001	13:47	3.15	14.36	
	0510	O	17.31	04/02/2001	11:44	2.94	14.37	
	0511	O	18.63	04/02/2001	11:25	1.77	16.86	
	0512	O	18.54	04/02/2001	11:27	1.60	16.94	
	0513	O	18.53	04/02/2001	11:26	1.62	16.91	
	0514	O	17.41	04/02/2001	13:57	2.70	14.71	
	0515	O	17.61	04/02/2001	13:58	2.70	14.91	

Table 2 (continued). Water-Level Data at the Pinellas STAR Center

	WELL ID	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT DATE	MEASUREMENT TIME	WATER DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
PIN18	WASTEWATER NEUTRALIZATION AREA							
	0516	O	17.52	04/02/2001	14:02	3.14	14.38	
	0517	O	17.87	04/02/2001	14:06	3.26	14.61	
	0518	O	17.94	04/02/2001	14:04	3.55	14.39	
	0519	O	17.94	04/02/2001	14:08	3.48	14.46	
	0520	O	17.89	04/02/2001	11:43	3.54	14.35	
	0521	O	17.90	04/02/2001	11:44	4.32	13.58	
	0522	O	18.03	04/02/2001	11:42	4.29	13.74	
	0523	O	18.77	04/02/2001	11:52	3.98	14.79	
	0524	O	18.80	04/02/2001	11:51	4.10	14.70	
	0525	O	18.69	04/02/2001	11:46	3.89	14.80	
	0526	O	21.00	04/02/2001	11:20	4.05	16.95	
	RW01	O	20.73	04/02/2001	11:53	5.88	14.85	
	RW02	O	22.05	04/02/2001	11:36	13.67	8.38	
	RW03	O	20.48	04/02/2001	11:58	11.66	8.82	
PIN21	PINELLAS PERIMETER MONITOR WELLS							
	0500	D	17.75	04/02/2001	16:08	4.15	13.60	
	0501	D	17.77	04/02/2001	16:05	4.28	13.49	
	0502	D	15.07	04/02/2001	16:13	1.75	13.32	
	0503	D	15.05	04/02/2001	16:15	1.74	13.31	
	0504	D	17.10	04/02/2001	14:38	3.35	13.75	
	0505	D	17.01	04/02/2001	14:39	3.28	13.73	
	0512	D	16.84	04/02/2001	14:44	3.14	13.70	

FLOW CODES:
B BACKGROUND D DOWN GRADIENT O ON-SITE

WATER LEVEL FLAGS:

Table 3. Floridan Monitoring Well Water Level Information

Well Identification	Previous Water Level Elevation (ft, MSL)	Current Water Level Elevation (ft, MSL)
PIN15–0513	6.66	7.38
PIN12–0527	6.81	7.53
PIN12–0528	6.67	7.48

Table 4. Vertical Hydraulic Differential

Water Level Measured From	Well Identification	Water Level Elevation (ft, MSL)
Deep Surficial Aquifer	PIN15–M12D	14.00
Floridan Aquifer	PIN15–0513	7.38

Table 5. Surface Water Measurements

Pond Location	Previous Water Level Elevation (ft, MSL)	Current Water Level Elevation (ft, MSL)
East Pond	14.18	14.32
South Pond	13.77	13.67
West Pond	14.91	15.27
Southwest Pond	13.77	13.68

Table 6. Field Measurements of Samples Collected at the Pinellas STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN05	**Trench Site**					
0500	22.95	693	12.3	6.67	192.4	0.69
PIN06	**Old Drum Storage Site**					
0500	25.07	1,175	2.8	6.76	-26.5	0.56
0501	23.6	1,263	3.2	6.64	179.8	0.63
PIN09	**Incinerator Site**					
0500	26.05	1,450	1.1	6.82	-30.6	0.45
PIN10	**Incinerator Ditch**					
0500	23.1	933	17.8	6.79	48.8	0.45
PIN12	**Industrial Drain Leaks Building 100**					
0508	22.4	708	1.2	6.53	61.7	1.38
0509	23.79	1,390	2.8	6.73	-22.5	1.65
0510	24.96	861	0	6.52	67.7	2.78
0511	24.4	336	15.2	6.49	88	3.48
0512	26.8	808	0.5	6.57	-86.2	1.43
0513	23	910	9.2	6.7	-82	0.64
0514	23.67	1,565	41.5	6.61	-66.5	0.97
0515	25.06	813	11.6	6.71	-110.9	0.44
0516	25.37	1,212	65	6.64	-39.9	0.67
0517	26.9	825	287	6.88	-116	0.6
0518	26.8	795	44.6	6.68	-60	0.66
0520	26.81	1,487	91.8	6.78	42.9	0.46
0521	26.24	909	17.9	6.98	-47.6	0.34
0522	24.59	1,196	1.6	6.83	20.9	0.83
0523	23.82	794	0.2	6.91	-41.8	0.71
0524	26.15	1,383	7.3	6.56	-78.2	1.26
0525	25.74	816	7	6.77	100.5	2.48
0526	28.97	2,261	23.9	6.5	-92.5	1.47
0527	32.42	1,301	145.7	7.04	-125.1	0.98
0528	24.9	1,226	4.1	7.04	-241	2.05
RW01	27.13	784	0	6.72	-38	1.5
RW02	26.89	750	0	6.76	-40.9	1.5
S29C	23	1,268	8.9	6.59	-70.6	3.86
S30B	22	13.52	7.9	6.67	-69	8.22
S31B	23.5	781	5.2	6.69	-76	1.25
S32B	22.7	1,105	8.2	6.63	-71	1.8
S33C	22.92	1,192	85.3	6.71	-84.7	1.51
S35B	22.94	1,568	17.1	6.45	-38	3.43
S36B	23.61	618	14.3	6.35	-39	4.2
S37B	22.97	1,023	55	6.66	-101	5.58
S54D	23.05	1,478	12.3	6.68	-237	0.59

Table 6 (continued). Field Measurements of Samples Collected at the Pinellas STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN12	**Industrial Drain Leaks Building 100 (continued)**					
S55B	23.5	563	304	6.51	-143	1.49
S55C	23.6	776	394	6.84	-265	1.36
S56B	22.9	1,518	239	6.79	-110	0.46
S56C	22.9	1,539	--	6.89	-130	0.45
S56D	22.91	1,638	1,482.9	6.85	-196.3	0.56
S57B	22.9	1,276	488	6.94	-117	0.95
S57C	22.9	1,110	505	6.75	-207	0.93
S57D	22.9	1,481	550	6.66	-151	1.1
S59B	21.6	1,123	189	7.09	-114	--
S59C	21.6	1,053	150	8.81	-197	2.35
S59D	22.3	1,435	86	6.99	-123	1.64
S60B	22.2	821	98	7.26	-117	--
S60C	22.5	403	>500	8.94	-13	--
S60D	22.4	760	>500	9.36	-15	5.03
S61B	24.2	1,135	69	6.73	-115	1.11
S61C	24.7	552	153	7.49	-123	2.94
S61D	25.27	1,559	116	6.6	-82.6	2.15
S62B	26.3	539	17.4	8.09	126	7.8
S62C	27.8	1,646	12.6	6.65	-116	1.19
S62D	28.2	1,374	13	6.82	-82	1.5
S63B	26.7	1,925	600	6.72	-116	1.28
S63C	28.3	1,463	360	6.96	-88	7.03
S63D	28.3	1,490	3.2	6.77	-124	1.09
S64B	27.54	1,374	181	6.78	-121	2.09
S64C	28.2	1,282	17.7	6.94	-126	0.98
S64D	27.89	1,533	914	6.67	-89.3	0.99
S65B	28.1	782	13	7.31	-127	6.71
S65C	30	955	86	7.08	-160	1.58
S65D	29.1	1,455	19	6.74	-91	1.61
S66B	27.5	1,908	6.2	6.94	-87	5.56
S66C	28.9	1,401	72.1	6.81	-112	1.01
S66D	29.21	1,425	40.6	6.73	-49.2	1.46
TE03	27.89	852	2.5	6.74	-101.6	1.47
PIN15	**Northeast Site**					
0502	23.27	4,583	14.2	5.97	-81.9	1.17
0503	24.26	1,141	36.8	6.48	-51	1.09
0506	23.94	1,159	33.7	6.88	-2.3	3.7
0507	23.1	606	42.7	6.83	33.8	0.27
0510	28.16	2,138	17	6.71	-15.9	0.99
0513	24.52	1,306	20.3	7.01	-292.1	0.16

Table 6 (continued). Field Measurements of Samples Collected at the Pinellas STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN15	**Northeast Site (continued)**					
0514	23.46	1,035	82.7	6.2	-22.3	0.48
0515	22.24	425	2.7	7.2	-70.1	0.46
0516	23.61	699	5.2	7.09	45.7	4.37
0518	24.05	1,824	12.6	6.71	9.1	0.68
0520	22.81	364	19.2	6.65	-59.2	0.97
0523	22.48	1,786	150.4	6.6	-69.2	0.36
0530	22.1	361	41.2	7.33	-50.1	0.63
0531	23.12	2,306	28.2	6.57	-31.1	0.42
0533	24.38	798	0.1	6.68	-55.9	1.07
0534	24.56	1,788	40.9	6.72	101.3	0.38
0535	23.61	1,570	84.3	6.7	-3.2	0.25
0536	23.7	1,485	243	6.44	23.7	0.36
0537	26.08	1,068	2.9	6.69	-7.8	0.33
0538	22.85	1,504	190.2	6.31	-121	6.31
0557	23.63	1,200	96.5	6.71	36.7	1.02
0558	25.53	1,190	29.7	6.71	7.4	0.68
0559	26.25	1,174	28.2	6.79	62.6	0.51
DRW5	25.25	1,600	0.1	6.61	-61.7	0.38
M03D	22.79	1,373	38.8	6.43	-13.3	0.94
M03S	21.6	1,369	1.7	6.57	3.3	0.78
M12D	23.07	1,026	29.9	6.8	12.2	0.26
M12S	23.22	322	50.4	7	180.1	1.63
M14D	24.07	989	116.8	6.57	-.3	0.43
M14S	23.25	803	117.9	6.82	90.9	0.95
M16D	23.9	940	25.3	6.72	-17.3	0.63
M16S	22.77	640	167.4	6.9	78.9	0.6
M17D	26.74	1,141	7	6.12	52	0.76
M17S	23.96	1,877	0.1	6.81	10.4	2.99
M18D	23.72	2,014	158.9	6.7	46.6	0.25
M18S	22.02	1,109	19.2	6.8	103.8	5.62
M24D	24.63	1,664	1,313.6	6.69	-21.9	0.48
M26D	24.23	1,406	4.2	6.74	-21.2	0.81
M26S	23.33	1,867	17	6.64	-78.3	1.47
M27D	23.16	1,899	64.8	6.66	-1.4	0.25
M27S	21	435	5.6	7.19	-45	4
M28D	24.15	1,642	30	6.72	-42.8	0.86
M28S	23.26	1,990	18.9	6.52	-48.4	1.21
M29D	23.75	260	8.5	6.12	-12.9	0.28
M29S	22.54	477	7.5	7.14	-34.9	0.4
M30D	23.97	1,136	34.6	6.62	-55.5	1.05

Table 6 (continued). Field Measurements of Samples Collected at the Pinellas STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN15	**Northeast Site (continued)**					
M30S	23.24	1,066	3	6.59	-32.7	3.92
M31D	24.24	1,321	18.1	6.63	-4.2	0.49
M31S	23	1,146	5.4	6.81	-25.5	0.46
M32D	25.19	1,156	119.3	6.67	-15.2	0.34
M32S	25.91	977	5.7	6.91	35.7	0.83
M33D	23.69	697	69.7	6.76	1	0.29
M34D	24.33	1,010	0.2	6.61	-5.9	0.66
M35D	24.88	3,400	0	5.98	42.9	2.58
M36D	24.82	3,395	0	5.86	-6	0.01
M37D	25.24	2,054	0	5.73	0.1	0.1
NRW1	24.1	2,321	0.4	6.69	-40.2	1.36
NRW2	23.27	1,244	2.9	6.7	2.6	0.2
NRW4	23.25	811	4.7	6.73	-26.7	0.58
RW04	23.79	1,311	0.4	6.59	-24.9	0.77
RW07	24.67	1,209	0.5	6.72	-57.4	0.79
RW08	24.83	2,295	1.5	6.54	-25.9	1.53
RW09	24	1,514	0.2	7	-27.2	0.62
RW11	24.23	1,554	17.5	6.35	-61.5	5.13
RW12	24.59	1,208	13.7	6.62	-45	1.24
RW13	23.75	1,214	0.3	6.27	-25.7	0.58
RW14	24	1,208	0.2	6.25	-22.1	1.46
RW15	23.43	1,875	145.2	6.47	-34	0.81
RW16	25.42	1,200	4.7	6.62	32.7	1.24
RW17	23.2	1,468	0.9	6.47	-22.6	1.31
PIN18	**Wastewater Neutralization Area**					
0500	23.08	406	10	6.93	-23.8	1.72
0501	23.67	693	1.8	6.81	-8.4	1.99
0502	23.77	768	15.7	6.68	-36.4	1.72
0503	26.5	0.881	18.2	6.64	-110	2.8
0504	23.49	549	16.5	6.88	-94.4	0.99
0505	26.6	750	47.8	6.83	28	0.9
0506	26	746	19.3	6.72	49	0.62
0507	27.67	1,444	22.8	6.73	79.8	1.26
0508	24.94	960	17.1	6.86	-131.3	0.45
0509	27.2	1,171	24.4	6.8	6.7	0.45
0510	26.9	1,013	160	6.75	-8.6	0.5
0511	25.98	1,340	2	6.72	36	0.42
0512	26.3	1,072	3.8	6.63	60.9	0.51
0513	25.44	937	34.1	6.52	80.9	0.41
0514	27.4	1,469	85	6.69	2.7	0.44

Table 6 (continued). Field Measurements of Samples Collected at the Pinellas STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN18	**Wastewater Neutralization Area (continued)**					
0515	27.3	1,340	7.9	6.71	-132	0.46
0516	26.94	1,325	30.8	6.71	129.4	0.45
0517	27.6	1,648	6	6.84	22.8	--
0518	27.2	1,532	10.1	6.76	-26.8	--
0519	26.7	1,018	2.5	6.82	-43.4	0.62
0520	24.52	1,555	65	6.77	-41.9	0.78
0521	23.97	822	3.7	6.76	-95.8	0.67
0522	22.5	752	27.5	6.67	-38.8	1.01
0523	24.91	905	47	6.63	4.6	1.74
0524	24.29	538	18.3	6.91	-89.3	3.14
0525	23.18	378	18.4	6.65	84.4	1.96
0526	24.52	620	141.1	6.55	-118.5	0.41
RW02	24.63	487	49.4	7.08	-23	4.52
RW03	24.25	659	3.2	6.82	-70.3	1.85
PIN21	**Perimeter Monitor Wells**					
0500	24.66	655	35.5	6.78	-69.2	4.44
0501	26.37	1,517	8.8	6.72	-87.6	2.81
0502	23.45	875	4.9	6.51	-60.5	2.34
0503	24.8	919	97	6.54	-88	2.07
0504	21.8	990	7.1	6.73	15	0.87
0505	23.5	1,081	27.9	6.68	-61.3	1.11
0512	23.9	1,003	83.5	6.56	-103	0.83

[a]temperature corrected to 25°C
-- Not measured

Table 7. Total VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN05	**Trench Site**								
0500	<1	<1	<1	<1	<1	<1	<1	<5	ND
PIN06	**Old Drum Storage Site**								
0500	<1	0.14J	<1	<1	0.28J	<1	<1	0.53J	3[c]
0501	0.18J	<1	<1	<1	<1	<1	<1	0.36J	2.1[c]
PIN09	**Incinerator Site**								
0500	<1	0.15J	<1	<1	0.54J	<1	<1	0.36J	4.4[c]
PIN10	**Incinerator Ditch**								
0500	0.37J	0.66J	<1	<1	<1	0.25J	<1	0.32J	ND
PIN12	**Industrial Drain Leaks Building 100**								
0508	<1	<1	<1	<1	<1	<1	<1	2.8J	ND
0509	<1	0.43J	<1	<1	2.3	<1	<1	0.31J	21.3[c]
0510	<1	<1	<1	<1	<1	<1	<1	1.1J	ND[b]
0511	<1	<1	<1	<1	<1	<1	<1	<5	ND
0512	<1	<1	<1	<1	<1	<1	<1	2.4J	ND
0513	<1	21	1.7	0.31J	33	27	<1	<5	82.7
0514	<2.5	57	68	0.43J	<2.5	19	<2.5	<12	144
0515	<1	<1	<1	<1	<1	<1	<1	0.91J	ND
0516	<1	<1	<1	<1	<1	<1	<1	0.76J	ND
0517	<1	<1	<1	<1	<1	<1	<1	<5	ND
0518	<1	<1	<1	<1	3.2	<1	<1	<5	3.2
0520	<10	510	<10	1.5J	82	<10	<10	5J	592
0521	1.2	2	0.18J	0.15J	2.4	<1	<1	0.4J	25.9[c]
0522	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
0523	0.13J	2.2	<1	<1	<1	0.65J	<1	0.6J	2.2[b]
0524	<5	170	1.5J	4.3J	93	<5	<5	<25	268.2[c]
0525	<1	5.3	<1	<1	<1	<1	<1	<5	5.3
0526	<1	2.8	1.7	<1	3.3	<1	<1	0.32J	7.8
0527	<1	<1	<1	<1	<1	<1	<1	0.39J	ND
0528	<1	<1	<1	<1	<1	<1	<1	0.75J	ND
RW01	2,200	1,500	54	<50	260	<50	<50	<250	4,014
RW02	910	730	50	<50	<50	<50	<50	<250	1,690
S29C	<1	0.3J	3.1	<1	4.4	2.7	5.9	0.44J	16.1[b]
S30B	20,000	15,000	7,300	790J	420J	<500	<500	800J	42,300
S31B	1.2	0.96J	0.34J	<1	1.4	<1	<1	0.41J	4.1[c]
S32B	<5	44	12	31	91	120	6.5	1.3J	524.5[c]
S33C	6.9	360	21	9.5	310	51	1.8J	1.1J	767.2[b,c]
S35B	35,000	71,000	10,000	430J	13,000	<2,500	<2,500	<12,000	129,000

Table 7 (continued). Total VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN12	**Industrial Drain Leaks Building 100 (continued)**								
S36B	<1	0.34J	0.32J	<1	<1	<1	0.37J	<5	ND
S37B	1.4	71	2	0.7J	80	1.2	<1	0.53J	165.3[c]
S54D	9,500	31,000	210J	320J	4,600	<500	<500	<2,500	45,100
S55B	<50	2,000	<50	<50	1,700	<50	<50	<250	3,700[b]
S55C	<250	7,500	<250	<250	2,400	<250	<250	<1,200	9,900
S56B	<1	<1	0.22J	<1	<1	<1	<1	0.36J	ND
S56C	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	ND
S56D	0.46J	0.54J	<1	<1	<1	<1	<1	0.39J	ND
S57B	<1	0.12J	<1	<1	<1	<1	<1	<5	ND
S57C	16,000	26,000	<1,000	1,300	16,000	<1,000	<1,000	<5,000	59,300
S57D	5.6	98	1.1J	3.6J	210	<5	<5	<25	313.6[c]
S59B	<1	1.9	<1	<1	2.9	3.7	<1	0.53J	8.5
S59C	1.5	5.3	<1	<1	5.8	<1	0.49J	0.56J	12.6[c]
S59D	0.18J	0.15J	<1	<1	<1	<1	<1	0.56J	ND
S60B	0.64J	7.5	<1	1.3	2.2	12	<1	0.58J	23
S60C	1.6	0.76J	0.19J	<1	<1	<1	<1	0.6J	1.6
S60D	1	0.86J	0.32J	<1	<1	<1	<1	0.56J	1
S61B	<1	<1	<1	<1	<1	<1	<1	1.8J	ND
S61C	<1	0.45J	<1	<1	0.75J	<1	<1	0.81J	ND
S61D	<1	6.1	<1	<1	6.4	<1	1.3	1.9J	13.8
S62B	<1	<1	<1	<1	<1	<1	<1	0.35J	ND
S62C	<1	2.8	1.6	<1	<1	<1	<1	0.32J	4.4
S62D	<1	<1	<1	<1	<1	<1	<1	<5	ND
S63B	<1	1	<1	<1	3.5	<1	<1	<5	4.5
S63C	<1	2.1	1.2	<1	9.9	1	<1	<5	14.2
S63D	<1	0.2J	0.46J	<1	11	0.46J	<1	0.32J	11
S64B	<1	<1	<1	<1	<1	<1	<1	0.84J	ND
S64C	<1	4.8	3.6	<1	8.8	<1	<1	0.63J	17.2
S64D	<1	<1	<1	<1	<1	<1	<1	0.64J	ND
S65B	<1	<1	<1	<1	<1	<1	<1	0.32J	ND
S65C	<1	<1	<1	<1	<1	<1	<1	0.7J	ND
S65D	<1	<1	<1	<1	<1	<1	<1	0.65J	ND
S66B	<1	<1	<1	<1	<1	<1	<1	1J	ND
S66C	<1	13	9.5	0.19J	6.5	0.19J	<1	1.1J	29
S66D	<1	<1	<1	<1	<1	<1	<1	0.81J	ND
TE03	<1	<1	<1	<1	5.1	<1	<1	1.8J	5.1

Table 7 (continued). Total VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN15	**Northeast Site**								
0502	<500	<500	<500	<500	<500	<500	<500	6,800	6,800
0503	<1	<1	<1	<1	<1	<1	<1	1.1J	1[b]
0506	<1	<1	<1	<1	<1	<1	<1	2.1J	ND
0507	<1	<1	<1	<1	<1	<1	<1	1.7J	ND
0510	<1	<1	<1	<1	0.21J	<1	<1	1.1J	ND
0513	<1	<1	<1	<1	<1	<1	<1	<5	ND
0514	<10	<10	<10	<10	100	<10	<10	<50	637[b]
0515	<1	<1	<1	<1	<1	<1	<1	1.1J	ND
0516	<1	<1	<1	<1	<1	<1	<1	<5	ND
0518	<1	<1	<1	<1	<1	<1	<1	1.1J	ND
0520	<1	<1	<1	<1	<1	<1	<1	1.1J	ND
0523	<1	<1	<1	<1	<1	<1	<1	<5	ND
0530	<1	<1	<1	<1	<1	<1	<1	<5	ND
0531	<1	<1	<1	<1	<1	<1	<1	<5	ND
0533	5,200	16,000	<250	42J	1,700	<250	<250	610J	22,900[b,c]
0534	<1	<1	<1	<1	<1	<1	<1	0.55J	ND
0535	<1	<1	<1	<1	<1	<1	<1	<5	2[b]
0536	670	16,000	400	52J	11,000	<250	<250	410J	28,070[b]
0537	25J	20,000	<250	86J	3,600	<250	<250	300J	23,600[b]
0538	<2,500	70,000	<2,500	<2,500	62,000	<2,500	<2,500	<12,000	137,300[b]
0557	<1	<1	<1	<1	6.5	<1	<1	0.79J	6.5[b,c]
0558	<500	180J	<500	<500	11,000	<500	<500	490J	11,000[b]
0559	<1	<1	<1	<1	<1	<1	<1	1.1J	ND[b]
DRW5	560	4,200	<100	24J	840	<100	<100	51J	7,400[b]
M03D	<1	<1	<1	<1	<1	<1	<1	<5	4.3[b,c]
M03S	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
M12D	<1	<1	<1	<1	<1	<1	<1	1.6J	ND
M12S	<1	<1	<1	<1	<1	<1	<1	1.6J	ND
M14D	<1	<1	<1	0.2J	0.54J	<1	<1	0.39J	ND
M14S	<1	<1	<1	<1	0.33J	<1	<1	<5	ND
M16D	<1	<1	<1	<1	<1	<1	<1	<5	ND
M16S	<1	<1	<1	<1	<1	<1	<1	<5	ND
M17D	1,200J	130,000	<5,000	<5,000	19,000	<5,000	<5,000	70,000	262,000[b]
M17S	<1	0.22J	<1	<1	<1	<1	<1	0.16J	7.7[b]
M18D	<1	<1	<1	<1	<1	<1	<1	0.44J	ND
M18S	<1	<1	<1	<1	<1	<1	<1	0.42J	ND
M24D	<1	<1	<1	<1	<1	<1	<1	<5	ND

Table 7 (continued). Total VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN15	**Northeast Site (continued)**								
M26D	<1	<1	<1	<1	<1	<1	<1	<5	ND
M26S	1.6	17	<1	<1	4.4	<1	<1	0.58J	25[b]
M27D	<1	<1	<1	<1	<1	<1	<1	0.74J	21.7[b]
M27S	<1	<1	<1	<1	<1	<1	<1	1.4J	ND
M28D	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
M28S	4.6	13	<1	<1	<1	<1	<1	<5	17.6
M29D	<1	<1	<1	<1	<1	<1	<1	<5	4.1[b]
M29S	<1	<1	<1	<1	<1	<1	<1	<5	ND
M30D	<1	<1	<1	<1	4.4	<1	<1	<5	4.4[b]
M30S	<1	<1	<1	<1	<1	<1	<1	0.87J	ND
M31D	<50	1,700	<50	<50	2,300	<50	<50	<250	4,000[b]
M31S	<10	260	2J	<10	420	<10	<10	9.4J	680[b]
M32D	<1	<1	<1	<1	0.21J	<1	<1	1.8J	ND
M32S	<1	0.23J	<1	<1	0.2J	<1	<1	2.2J	ND
M33D	<1	<1	<1	<1	<1	<1	<1	0.44J	ND
M34D	<500	430J	<500	<500	22,000	<500	<500	65J	22,000[b]
M35D	25,0000	150,000	<50,000	<50,000	<50,000	<50,000	<50,000	2,500,000	2,995,000[b,c]
M36D	<500	8,000	<500	<500	22,000	<500	<500	960J	42,000[b,c]
M37D	<500	1,600	<500	<500	18,000	<500	<500	870J	28,000[b]
NRW1	<1	<1	<1	<1	<1	<1	<1	<5	ND
NRW2	<1	<1	<1	<1	<1	<1	<1	2J	ND
NRW4	<1	<1	<1	<1	0.16J	<1	<1	1.8J	1[b]
RW04	0.11J	0.24J	<1	<1	<1	<1	<1	0.44J	3.5[b]
RW07	<5	340	5	1.6J	340	<5	<5	2.5J	685[b]
RW08	120	1,200	<50	6.5J	1,200	<50	<50	620	3,700[b]
RW09	<5	6.1	7.8	<5	260	<5	<5	<25	661.9[b]
RW11	<1,000	8,500	<1,000	<1,000	9,000	<1,000	<1,000	1,000J	26,700[b]
RW12	320J	9,200	<500	<500	7,600	<500	<500	600J	18,400[b]
RW13	<250	410	<250	<250	400	<250	<250	3,700	5,090[b]
RW14	260	5,300	<250	<250	6,100	<250	<250	9,000	22,060[b,c]
RW15	3,500	6,000	120	43J	3,200	<100	<100	330J	12,820[b]
RW16	<50	270	15J	<50	3,000	<50	<50	<250	3,270[b]
RW17	290J	80,000	<1,000	<1,000	59,000	<1,000	<1,000	<5,000	147,100[b]

Table 7 (continued). Total VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN18	**Wastewater Neutralization Area**								
0500	0.47J	3.3	2.1	<1	<1	<1	<1	0.56J	5.4
0501	<1	0.29J	<1	<1	<1	<1	<1	0.85J	ND[b]
0502	<1	<1	<1	<1	<1	<1	<1	0.34J	ND
0503	<1	0.2J	<1	<1	<1	<1	<1	1.1J	ND
0504	<1	<1	<1	<1	<1	<1	<1	0.83J	ND
0505	0.2J	1.1	<1	<1	<1	0.66J	<1	0.78J	1.1
0506	<1	<1	<1	<1	<1	<1	<1	0.76J	ND
0507	<1	<1	<1	<1	<1	<1	<1	0.61J	ND
0508	<1	<1	<1	<1	<1	<1	<1	0.77J	ND
0509	<1	<1	<1	<1	<1	<1	<1	0.55J	ND
0511	<1	<1	<1	<1	<1	<1	<1	<5	ND
0512	<1	<1	<1	<1	0.48J	<1	<1	0.38J	ND
0513	<1	0.34J	<1	<1	1.3	<1	<1	<5	1.3
0514	<1	<1	<1	<1	<1	<1	<1	0.53J	ND
0516	<1	<1	<1	<1	<1	<1	<1	0.34J	ND
0517	<1	<1	<1	<1	<1	<1	<1	0.5J	ND
0518	<1	<1	<1	<1	<1	<1	<1	0.53J	ND
0519	<1	<1	<1	<1	2.6	<1	<1	0.55J	3.8[b]
0520	<1	<1	<1	<1	<1	<1	<1	0.4J	ND
0521	<1	0.86J	<1	<1	<1	<1	<1	1.5J	ND
0522	<1	<1	<1	<1	<1	<1	<1	0.5J	ND
0524	<1	0.28J	<1	<1	<1	<1	<1	0.33J	ND
0526	<1	<1	<1	<1	<1	<1	<1	0.54J	3.3[b]
RW02	<1	0.24J	<1	<1	<1	<1	<1	0.52J	ND
RW03	<1	0.66J	<1	<1	<1	<1	<1	0.86J	ND
PIN21	**Perimeter Monitor Wells**								
0500	<1	<1	<1	<1	<1	<1	<1	0.35J	ND
0501	<1	1.1	<1	<1	<1	<1	<1	1.8J	1.1
0502	<1	<1	<1	<1	<1	<1	<1	1.6J	ND
0503	<1	<1	<1	<1	<1	<1	<1	1.8J	ND
0504	<1	<1	<1	<1	<1	<1	<1	2.3J	ND
0505	<1	<1	<1	<1	<1	<1	<1	2.4J	ND
0512	<1	1.2	<1	<1	2.6	<1	<1	2J	3.8

[a]"J" values are not included in the "Total VOCs" value.
[b]See the "BTEX Table" for additional analytical results.
[c]See the "Additional VOCs Table" for additional analytical results.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection limit.

Table 8. BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN05	**Trench Site**				
0500	<1	<1	<1	ND	ND
PIN06	**Old Drum Storage Site**				
0500	<1	<1	<1	ND	ND
0501	<1	<1	<1	ND	ND
PIN09	**Incinerator Site**				
0500	<1	<1	<1	ND	ND
PIN10	**Incinerator Ditch**				
0500	<1	<1	<1	ND	ND
PIN12	**Industrial Drain Leaks Building 100**				
0508	<1	<1	<1	ND	ND
0509	<1	<1	<1	ND	ND
0510	<1	0.37J	<1	ND	ND
0511	<1	<1	<1	ND	ND
0512	<1	<1	<1	ND	ND
0513	<1	<1	<1	ND	ND
0514	<2.5	<2.5	<2.5	ND	ND
0515	<1	<1	<1	ND	ND
0516	<1	<1	<1	ND	ND
0517	<1	<1	<1	ND	ND
0518	<1	<1	<1	ND	ND
0520	<10	<10	<10	ND	ND
0521	<1	<1	<1	ND	ND
0522	<1	<1	0.27J	ND	ND
0523	<1	<1	<1	0.47J	ND
0524	<5	<5	<5	ND	ND
0525	<1	<1	<1	ND	ND
0526	<1	<1	<1	ND	ND
0527	<1	<1	<1	ND	ND
0528	<1	<1	<1	ND	ND
RW01	<50	<50	<50	ND	ND
RW02	<50	<50	<50	ND	ND
S29C	<1	0.69J	<1	ND	ND
S30B	<500	<500	<500	ND	ND
S31B	<1	<1	<1	ND	ND
S32B	<5	<5	<5	ND	ND
S33C	2.1J	<5	<5	1.4J	ND
S35B	<2,500	<2,500	<2,500	ND	ND
S36B	<1	<1	<1	ND	ND
S37B	<1	<1	<1	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN12	**Industrial Drain Leaks Building 100 (continued)**				
S54D	<500	<500	<500	ND	ND
S55B	<50	15J	<50	ND	ND
S55C	<250	<250	<250	ND	ND
S56B	<1	<1	<1	ND	ND
S56C	<2.5	<2.5	<2.5	ND	ND
S56D	<1	<1	<1	ND	ND
S57B	<1	<1	<1	ND	ND
S57C	<1,000	<1,000	<1,000	ND	ND
S57D	<5	<5	<5	ND	ND
S59B	<1	<1	<1	ND	ND
S59C	<1	<1	<1	ND	ND
S59D	<1	<1	<1	ND	ND
S60B	<1	<1	<1	ND	ND
S60C	<1	<1	<1	ND	ND
S60D	<1	<1	<1	ND	ND
S61B	<1	<1	<1	ND	ND
S61C	<1	<1	<1	ND	ND
S61D	<1	<1	<1	ND	ND
S62B	<1	<1	<1	ND	ND
S62C	<1	<1	<1	ND	ND
S62D	<1	<1	<1	ND	ND
S63B	<1	<1	<1	ND	ND
S63C	<1	<1	<1	ND	ND
S63D	<1	<1	<1	ND	ND
S64B	<1	<1	<1	ND	ND
S64C	<1	<1	<1	ND	ND
S64D	<1	<1	<1	ND	ND
S65B	<1	<1	<1	ND	ND
S65C	<1	<1	<1	ND	ND
S65D	<1	<1	<1	ND	ND
S66B	<1	<1	<1	ND	ND
S66C	<1	<1	<1	ND	ND
S66D	<1	<1	<1	ND	ND
TE03	<1	<1	<1	ND	ND
PIN15	**Northeast Site**				
0502	<500	<500	<500	ND	ND
0503	1	<1	<1	0.8J	1
0506	<1	<1	<1	ND	ND
0507	<1	<1	<1	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN15	**Northeast Site (continued)**				
0510	<1	<1	<1	ND	ND
0513	<1	<1	<1	ND	ND
0514	27	510	<10	3.1J	537
0515	<1	<1	<1	ND	ND
0516	<1	<1	<1	ND	ND
0518	<1	<1	<1	ND	ND
0520	<1	<1	<1	ND	ND
0523	<1	<1	<1	ND	ND
0530	<1	<1	<1	ND	ND
0531	<1	<1	<1	ND	ND
0533	<250	39J	<250	114J	ND
0534	<1	<1	<1	ND	ND
0535	2	0.69J	<1	ND	2
0536	<250	81J	<250	ND	ND
0537	<250	130J	<250	ND	ND
0538	<2,500	5,300	<2,500	ND	5,300
0557	0.32J	<1	<1	ND	ND
0558	<500	69J	<500	ND	ND
0559	0.17J	<1	<1	ND	ND
DRW5	<100	1,800	<100	ND	1,800
M03D	4.3	0.14J	<1	1.32J	4.3
M03S	<1	<1	<1	0.16J	ND
M12D	<1	<1	<1	ND	ND
M12S	<1	<1	<1	ND	ND
M14D	<1	<1	<1	ND	ND
M14S	<1	<1	<1	ND	ND
M16D	<1	<1	<1	ND	ND
M16S	<1	<1	<1	ND	ND
M17D	780J	43,000	<5,000	ND	43,000
M17S	7.7	0.35J	<1	ND	7.7
M18D	<1	<1	<1	ND	ND
M18S	<1	<1	<1	ND	ND
M24D	<1	<1	<1	ND	ND
M26D	<1	<1	<1	ND	ND
M26S	2	<1	<1	ND	2
M27D	18	1.8	0.84J	1.9	21.7
M27S	<1	<1	<1	ND	ND
M28D	0.58J	<1	<1	ND	ND
M28S	<1	<1	<1	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN15	**Northeast Site (continued)**				
M29D	4.1	<1	<1	1.12J	4.1
M29S	<1	<1	<1	ND	ND
M30D	0.37J	<1	<1	ND	ND
M30S	<1	<1	<1	ND	ND
M31D	22J	32J	<50	27J	ND
M31S	6.3J	<10	<10	ND	ND
M32D	<1	<1	<1	ND	ND
M32S	<1	<1	<1	ND	ND
M33D	<1	<1	<1	ND	ND
M34D	<500	170J	<500	ND	ND
M35D	<50,000	95,000	<50,000	ND	95,000
M36D	220J	12,000	210J	490J	12,000
M37D	190J	8,400	<500	ND	8,400
NRW1	<1	<1	<1	ND	ND
NRW2	<1	<1	<1	ND	ND
NRW4	1	<1	<1	ND	1
RW04	3.5	<1	<1	ND	3.5
RW07	0.65J	2.5J	<5	ND	ND
RW08	<50	560	<50	ND	560
RW09	28	360	<5	ND	388
RW11	<1,000	9,200	<1,000	ND	9,200
RW12	<500	1,600	<500	ND	1,600
RW13	<250	580	<250	ND	580
RW14	<250	1,400	<250	ND	1,400
RW15	<100	22J	<100	ND	ND
RW16	<50	41J	<50	ND	ND
RW17	<1,000	8,100	<1,000	ND	8,100
PIN18	**Wastewater Neutralization Area**				
0500	<1	<1	<1	ND	ND
0501	0.93J	<1	<1	0.65J	ND
0502	<1	<1	<1	ND	ND
0503	<1	<1	<1	ND	ND
0504	<1	<1	<1	ND	ND
0505	<1	<1	<1	ND	ND
0506	<1	<1	<1	ND	ND
0507	<1	<1	<1	ND	ND
0508	<1	<1	<1	ND	ND
0509	<1	<1	<1	ND	ND
0511	<1	<1	<1	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN18	**Wastewater Neutralization Area (continued)**				
0512	<1	<1	<1	ND	ND
0513	<1	<1	<1	ND	ND
0514	<1	<1	<1	ND	ND
0516	<1	<1	<1	ND	ND
0517	<1	<1	<1	ND	ND
0518	<1	<1	<1	ND	ND
0519	1.2	<1	<1	ND	1.2
0520	<1	<1	<1	ND	ND
0521	<1	<1	<1	ND	ND
0522	<1	<1	<1	ND	ND
0524	<1	<1	<1	ND	ND
0526	<1	<1	1.1	2.2	3.3
RW02	<1	<1	<1	ND	ND
RW03	<1	<1	<1	ND	ND
PIN21	**Perimeter Monitor Wells**				
0500	<1	<1	<1	ND	ND
0501	<1	<1	<1	ND	ND
0502	<1	<1	<1	ND	ND
0503	<1	<1	<1	ND	ND
0504	<1	<1	<1	ND	ND
0505	<1	<1	<1	ND	ND
0512	<1	<1	<1	ND	ND

[a]m-, o-, p- Xylene if detected.
[b]"J" values are not included in the "Total BTEX" value.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection

Table 9. Additional Total VOCs in Samples Collected at the Pinellas STAR Center (reported in milligrams per liter)

Location	1,1,2,2-Tetrachloro-ethane	1,2-Dichloro-ethane	1,4-Dichloro-benzene	Bromo-methane	Dichloro-difluoro-methane	MTBE	Tetrachloro-ethene	Trichlorofluoro-methane
PIN06	**Old Drum Storage Site**							
0500		2			0.39J			1
0501			2.1					
PIN09	**Incinerator Site**							
0500					2			2.4
PIN12	**Industrial Drain Leaks Building 100**							
0509								19
0521					11			9.3
0524							0.63J	5.2
S31B					1.5			
S32B					220			3J
S33C					8.8			
S37B					9.7			
S57D								1.1J
S59C								0.81J
PIN15	**Northeast Site**							
0533							33J	
0557								0.95J
M03D						8.9J		
M35D	18,000J							
M36D				170J				
RW14							41J	

J Estimated value, result is between the reporting limit and the method detection limit.

Table 10. PIN 18 Arsenic Concentration in Samples Collected at the Pinellas STAR Center (reported in milligrams per liter)

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/L	0500	04/11/2001	N001	US	O	0.25			#	0.01	-
	mg/L	0500	04/11/2001	N002	US	O	0.25			#	0.01	-
	mg/L	0501	04/11/2001	N001	US	O	0.55			#	0.01	-
	mg/L	0502	04/11/2001	N001	US	O	0.20			#	0.01	-
	mg/L	0503	04/12/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	0504	04/12/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	0505	04/07/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	0506	04/07/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	0507	04/12/2001	N001	DS	O	0.010	U		#	0.01	-
	mg/L	0507	04/12/2001	N002	DS	O	0.010	U		#	0.01	-
	mg/L	0508	04/12/2001	N001	DS	O	0.010	U		#	0.01	-
	mg/L	0509	04/07/2001	N001	DS	O	0.010	U		#	0.01	-
	mg/L	0510	04/07/2001	N001	DS	O	0.010	U		#	0.01	-
	mg/L	0515	04/12/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	0521	04/11/2001	N001	SF	O	0.011			#	0.01	-
	mg/L	0522	04/11/2001	N001	US	O	0.10			#	0.01	-
	mg/L	0523	04/11/2001	N001	DS	O	0.010	U		#	0.01	-
	mg/L	0524	04/11/2001	N001	SF	O	0.025			#	0.01	-
	mg/L	0525	04/11/2001	N001	US	O	0.057			#	0.01	-
	mg/L	0526	04/12/2001	N001	SF	O	0.010	U		#	0.01	-
	mg/L	RW02	04/02/2001	0001	SF	O	0.049			#	0.01	-
	mg/L	RW02	04/02/2001	N001	SF	O	0.18			#	0.01	-
	mg/L	RW02	04/16/2001	N001	SF	O	0.18			#	0.01	-
	mg/L	RW02	05/01/2001	N001	SF	O	0.16			#	0.01	-
	mg/L	RW02	05/15/2001	N001	SF	O	0.14			#	0.01	-
	mg/L	RW02	05/30/2001	N001	SF	O	0.13			#	0.01	-
	mg/L	RW02	06/11/2001	N001	SF	O	0.11			#	0.01	-

Table 10 (continued). PIN 18 Arsenic Concentration in Samples Collected at the Pinellas STAR Center (reported in milligrams per liter)

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	SAMPLE: ID	ZONE COMPL.	FLOW REL.	RESULT	QUALIFIERS: LAB	QUALIFIERS: DATA	QUALIFIERS: QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/L	RW02	06/26/2001	N001	SF	O	0.13			#	0.01	-
	mg/L	RW03	04/02/2001	0001	SF	O	0.062			#	0.01	-
	mg/L	RW03	04/02/2001	N001	SF	O	0.12			#	0.01	-
	mg/L	RW03	04/16/2001	N001	SF	O	0.17			#	0.01	-
	mg/L	RW03	05/01/2001	N001	SF	O	0.071			#	0.01	-
	mg/L	RW03	05/15/2001	N001	SF	O	0.15			#	0.01	-
	mg/L	RW03	05/30/2001	N001	SF	O	0.070			#	0.01	-
	mg/L	RW03	06/11/2001	N001	SF	O	0.068			#	0.01	-
	mg/L	RW03	06/26/2001	N001	SF	O	0.067			#	0.01	-

U = Analytical result below detection limit.
QA Qualifier: # = validated according to Quality Assurance guidelines.

Table 11. Summary of Geochemical Parameters Measured in STAR Center Wells from July 2000 to April 2001

Parameter	Minimum Value	Maximum Value	Average Value
Building 100 Area			
Dissolved Oxygen (mg/L)	0.06	8.22	1.25
Oxidation Reduction Potential (mV)	-1,963	737	-100
Specific Conductance (µmhos)	13.52	2,910	1,238
Temperature (°C)	21.6	32.4	25.7
Turbidity (NTU)	0	1,483	109
pH	6.35	9.36	6.82
Northeast Site			
Dissolved Oxygen (mg/L)	0.01	6.31	0.86
Oxidation Reduction Potential (mV)	-292	180	-49
Specific Conductance (µmhos)	0.74	7,040	1,416
Temperature (°C)	19.3	28.5	24.8
Turbidity (NTU)	0	1,314	49
pH	5.73	7.33	6.61
WWNA			
Dissolved Oxygen (mg/L)	0.03	4.52	0.74
Oxidation Reduction Potential (mV)	-232	129	-60
Specific Conductance (µmhos)	0.88	2,310	864
Temperature (°C)	21.0	30.6	25.6
Turbidity (NTU)	0.4	160	26
pH	4.44	7.35	6.8

Table 12. Summary of Analytical Results for Groundwater Samples Collected at the Northeast Site Treatment System
(*reported in micrograms per liter unless otherwise noted)*

Location	Date Sampled	cis-1,2-DCE	trans-1,2-DCE	TCE	Methylene chloride	Vinyl chloride	Toluene	Benzene	MTBE	Total VOCs[a]	$CaCO_3$ mg/L	Fe mg/L
PIN15	**Northeast Site**											
INF1	4/2/01	3,900	21J	1,000	100J	1,800	230	<100	<1,000	6,930	470	4.1
INF1	4/16/01	4,000	17J	1,200	440J	1,900	270	<100	<1,000	7,370	76	4
INF1	5/1/01	3,700	17J	1,100	360J	2,100	480	<100	<1,000	7,380	600	5.5
INF1	5/21/01	4,500	<100	1,200	120J	1,600	250	<100	<1,000	7,550	470	4
INF1	6/5/01	3,500	<100	1,000	31J	1,600	280	<100	<1,000	6,380	470	4.2
INF1	6/19/01	3,100	<100	980	41J	950	200	<100	<1,000	5,230	430	3.6
EFF1	4/2/01	<1	<1	<1	0.5J	<1	<1	<1	<10	ND	500	4.6
EFF1	4/16/01	0.42J	<1	<1	0.95J	<1	<1	<1	<10	ND	80	4
EFF1	5/1/01	<1	<1	<1	<5	<1	<1	<1	<10	ND	510	3.8
EFF1	5/21/01	<1	<1	<1	<5	<1	<1	<1	<10	2.7[b]	460	3
EFF1	6/5/01	<1	<1	<1	<5	<1	<1	<1	<10	ND	470	3.9
EFF1	6/19/01	<1	<1	<1	<5	<1	<1	<1	<10	ND	430	3.6
CWL1	4/2/01	--	--	--	--	--	--	--	--	--	490	4.5
CWL1	4/16/01	--	--	--	--	--	--	--	--	--	74	3.8
CWL1	5/1/01	--	--	--	--	--	--	--	--	--	510	4.5
CWL1	5/21/01	--	--	--	--	--	--	--	--	--	470	5
CWL1	6/5/01	--	--	--	--	--	--	--	--	--	470	4.7
CWL1	6/19/01	--	--	--	--	--	--	--	--	--	430	3.9

[a]"J" values are not included in the "Total VOCs" value.
[b]Total VOCs value includes compounds not listed.
[c]CWL1 is the clear well. A holding tank after the pretreatment system and before the air stripper tower.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection limit.
-- Not Measured

Table 13. Estimated Mass of VOCs Recovered from the Northeast Site and Building 100 Recovery Wells During April, May, and June 2001

Month	Volume Treated (gallons)	Concentration[a]						
		cis-1,2-DCE (µg/L)	trans-1,2-DCE (mg/L)	Toluene (µg/L)	TCE (µg/L)	Methylene Chloride (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
April 2001	813,340	3,950.0	19.0	250.0	1,100.0	270.0	1,850.0	7,439.0
May 2001	850,048	4,100.0	33.5	365.0	1,150.0	240.0	1,850.0	7,738.5
June 2001	788,675	3,300.0	50.0	240.0	990.0	36.0	1,275.0	5,891.0

Month	Volume Treated (gallons)	Recovery[b]						
		cis-1,2-DCE (lbs)	trans-1,2-DCE (lbs)	Toluene (lbs)	TCE (lbs)	Methylene Chloride (lbs)	Vinyl Chloride (lbs)	Total VOCs (lbs)
April 2001	813,340	26.8	0.1	1.7	7.5	1.8	12.6	50.5
May 2001	850,048	29.1	0.2	2.6	8.2	1.7	13.1	54.9
June 2001	788,675	21.7	0.3	1.6	6.5	0.2	8.4	38.8

[a]These concentrations represent the average of weekly sampling results.
[b]Includes "J" (estimated) values. For any detection of "<", which indicates the laboratory could not detect that analyte, 50 percent of the "<" value was used for the calculation of recovery.

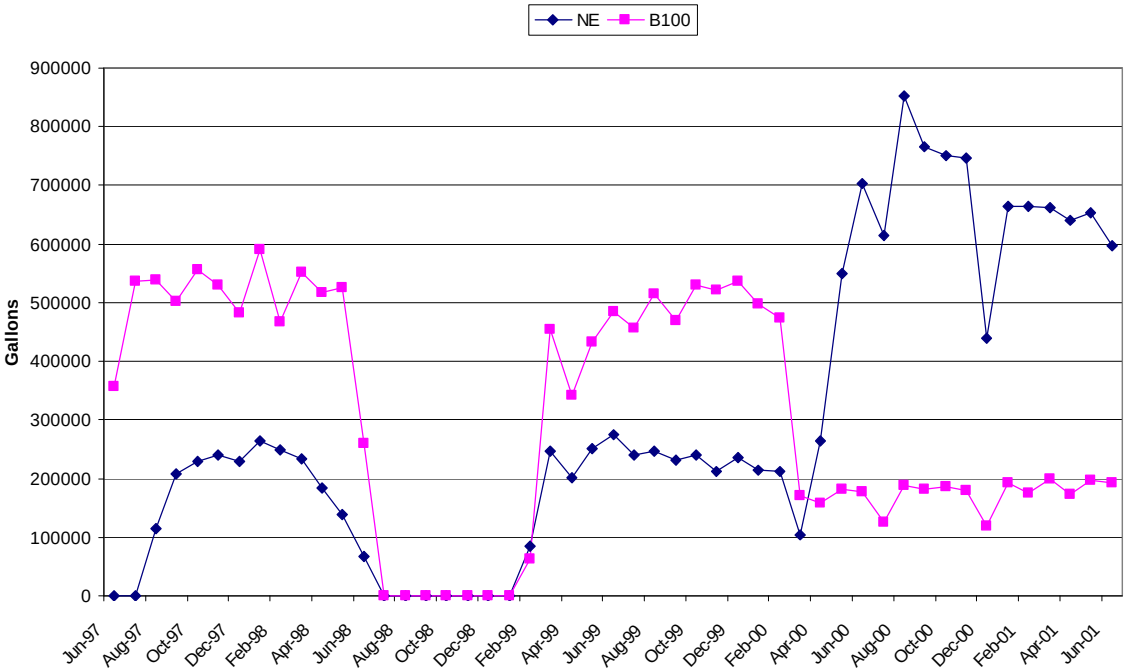

Chart 1. Historical Northeast Site and Building 100 Groundwater Recovery

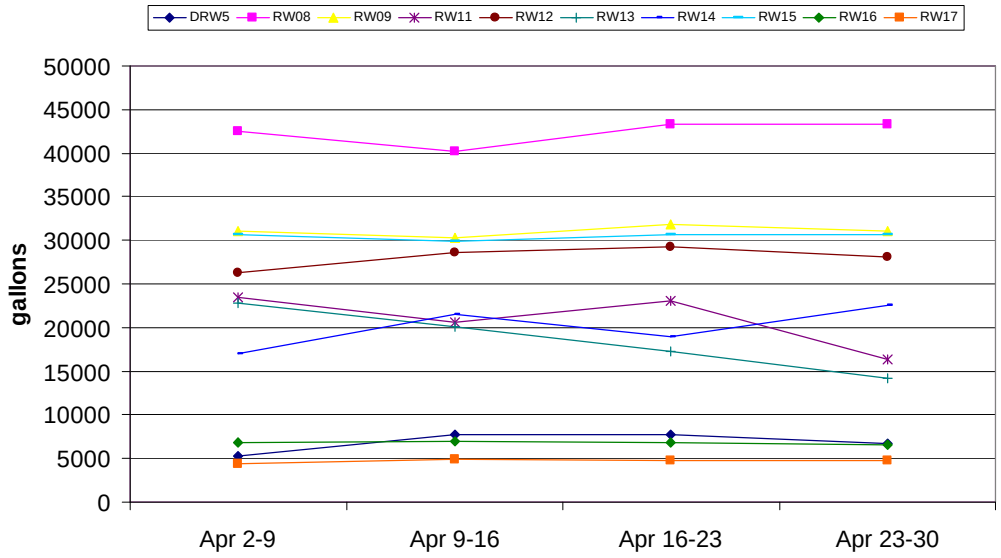

Chart 2. April 2001 Northeast Site (Individual Wells) Groundwater Recovery

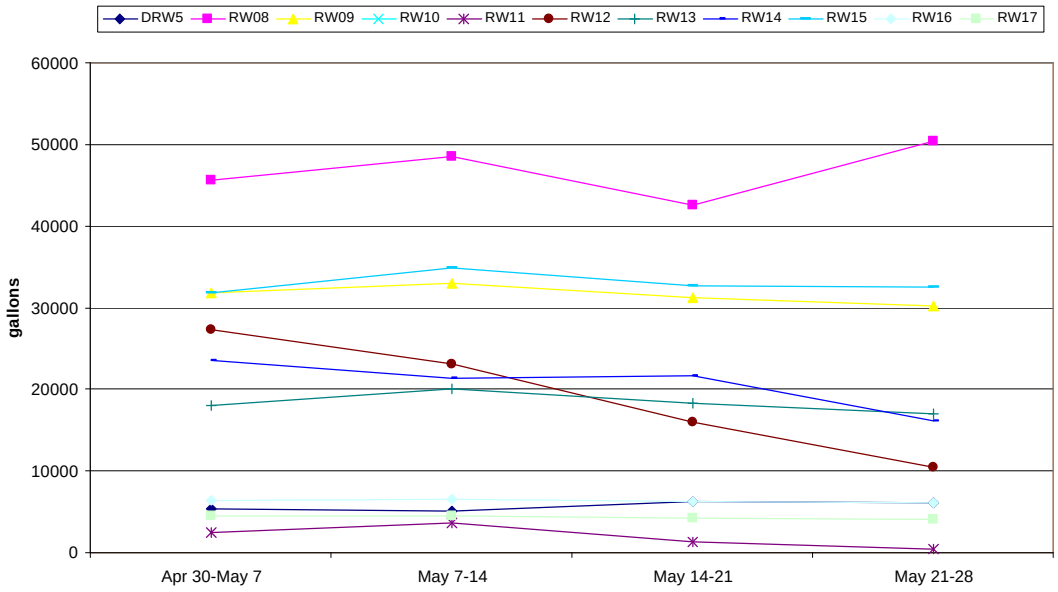

Chart 3. May 2001 Northeast Site (Individual Wells) Groundwater Recovery

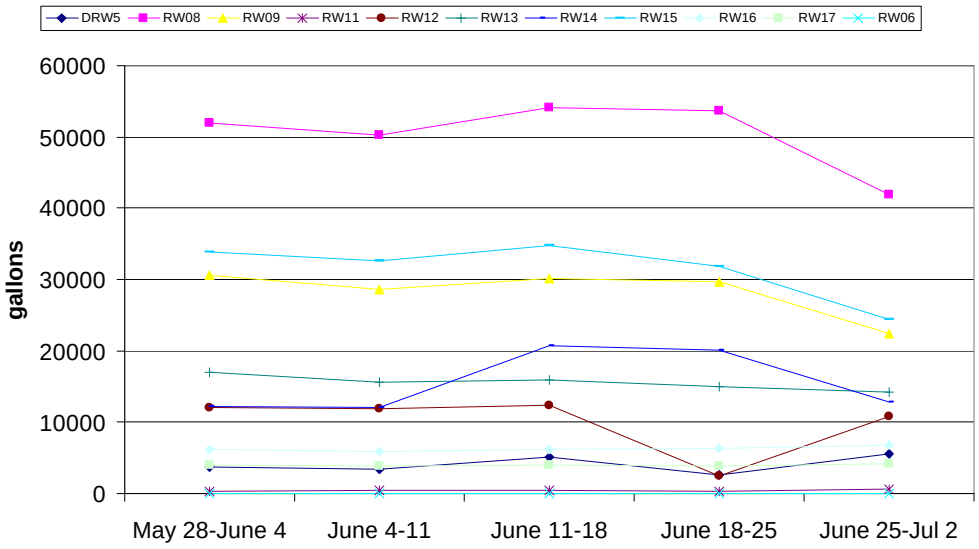

Chart 4. June 2001 Northeast Site (Individual Wells) Groundwater Recovery

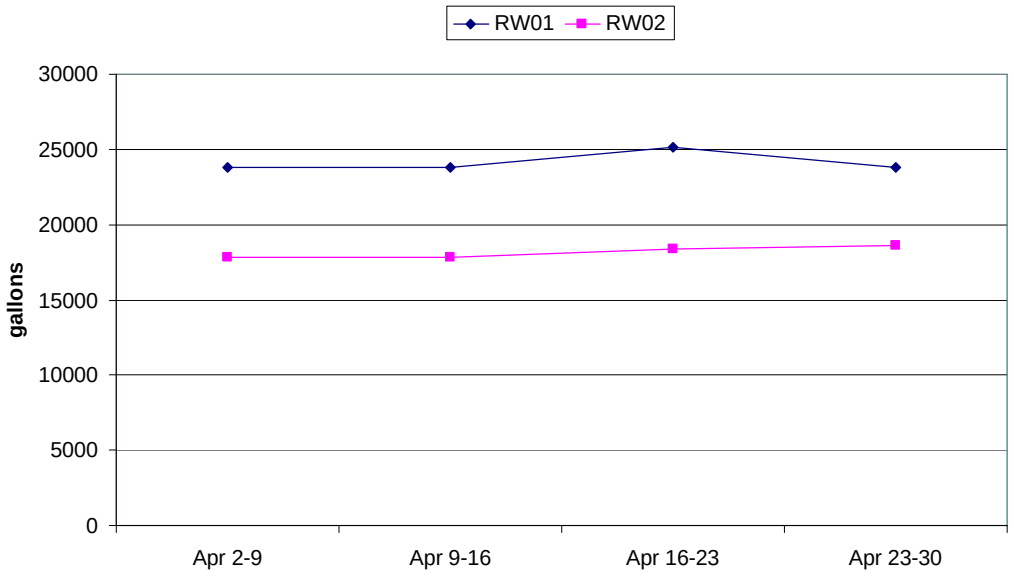

Chart 5. April 2001 Building 100 Groundwater Recovery

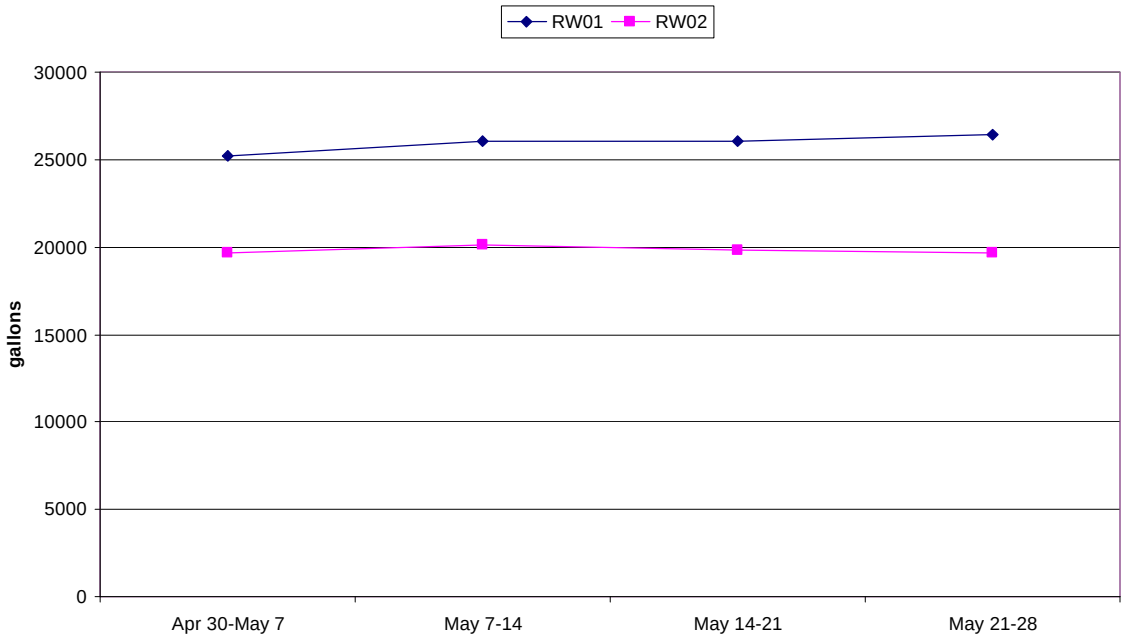

Chart 6. May 2001 Building 100 Groundwater Recovery

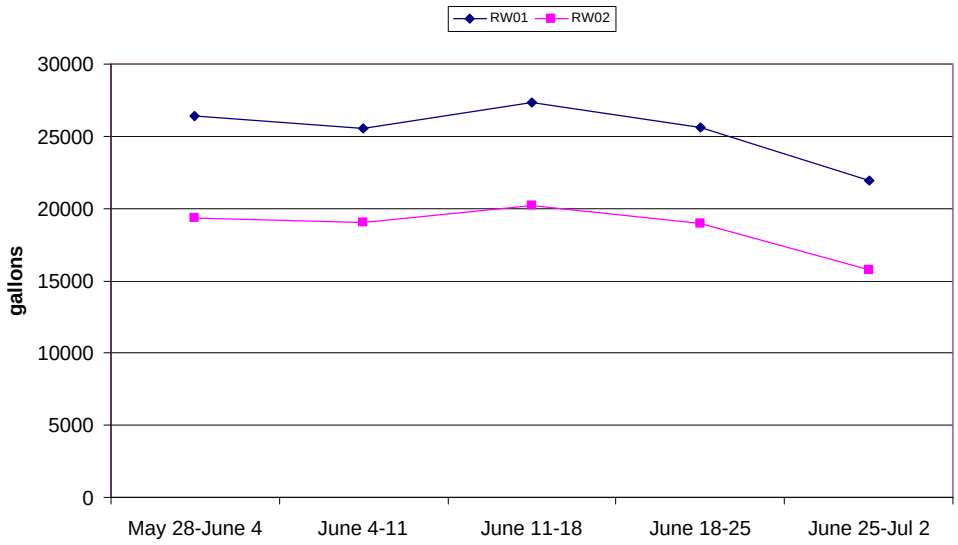

Chart 7. June 2001 Building 100 Groundwater Recovery

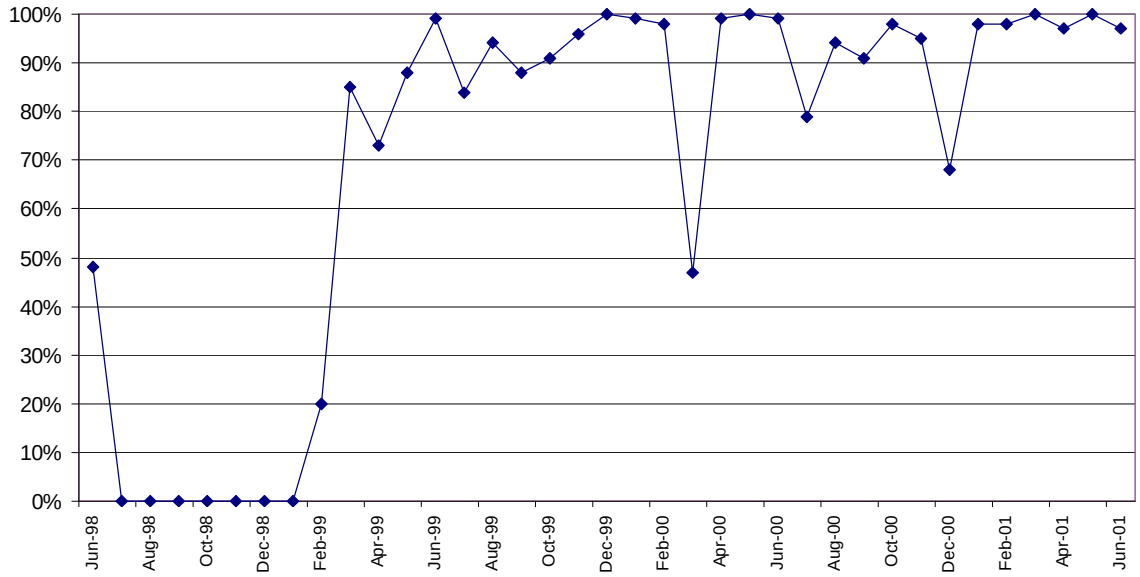

Chart 8. Historical Northeast Site Air Stripper—Percent Time On-Line

Appendix A

Laboratory Reports—April 2001 Quarterly Results

Table A–1. Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Case Number	Constituent	S[a]	D[b]	RPD Value	5 times DL[c]	Fail[d]
PIN12–0509	PIN12–0600	B151222	cis–1,2–Dichloroethene	0.43	0.34	23	5	
			Methylene chloride	0.31	0.38	20	25	
			Trichlorofluoromethane	19	24	23	5	
			Vinyl chloride	2.3	0.5	129	5	
PIN12–0526	PIN12–0589	B151132	cis–1,2–Dichloroethene	2.8	3	7	5	
			Methylene chloride	0.32	0.33	3	25	
			trans–1,2–Dichloroethene	1.7	1.9	11	5	
			Vinyl chloride	3.3	3.3	0	5	
PIN12–S32B	PIN12–0591	B151180	1,1–Dichloroethane	120	120	0	25	
			1,1–Dichloroethene	31	31	0	25	
			Chloroethane	6.5	6	8	25	
			cis–1,2–Dichloroethene	44	45	2	25	
			Dichlorodifluoromethane	220	230	4	25	
			Methylene chloride	1.3	1.9	38	125	
			trans–1,2–Dichloroethene	12	12	0	25	
			Trichlorofluoromethane	3	2	40	25	
			Vinyl chloride	91	100	9	25	
PIN12–S36B	PIN12–0592	B151179	Chloroethane	0.37	0.5	30	5	
			cis–1,2–Dichloroethene	0.34	0.5	38	5	
			Methylene chloride	2.5	1.5	50	25	
			trans–1,2–Dichloroethene	0.32	0.5	44	5	
PIN12–S57D	PIN12–0590	B151179	1,1–Dichloroethene	3.6	6.2	53	5	Fail
			trans–1,2–Dichloroethene	1.1	2	58	5	
			Trichloroethene	5.6	8.2	38	5	Fail
			Trichlorofluoromethane	1.1	2.5	78	5	
PIN12–S61D	PIN12–0593	B151221	Chloroethane	1.3	1.5	14	5	
			cis–1,2–Dichloroethene	6.1	5.8	5	5	
			Methylene chloride	1.9	0.85	76	25	
			Vinyl chloride	6.4	6.6	3	5	
PIN12–S63D	PIN12–0588	B151132	1,1–Dichloroethane	0.46	0.49	6	5	
			cis–1,2–Dichloroethene	0.2	0.2	0	5	
			Methylene chloride	0.32	0.38	17	25	
			trans–1,2–Dichloroethene	0.46	0.49	6	5	
			Vinyl chloride	11	9.8	12	5	
PIN15–0503	PIN15–0584	B151178	Benzene	1	0.97	3	5	
			m,p–Xylene	0.51	0.48	6	5	
			Methylene chloride	1.1	1.2	9	25	
			o–Xylene	0.29	0.26	11	5	
PIN15–0530	PIN15–0585	B151178	nondetect					

Table A–1 (continued). Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Case Number	Constituent	S[a]	D[b]	RPD Value	5 times DL[c]	Fail[d]
PIN15–0537	PIN15–0586	B151223	1,1–Dichloroethene	86	80	7	1250	
			cis–1,2–Dichloroethene	20000	21000	5	1250	
			Methylene chloride	300	170	55	6250	
			Toluene	130	130	0	1250	
			Trichloroethene	25	250	164	1250	
			Vinyl chloride	3600	3400	6	1250	
PIN15–M16D	PIN15–0582	B151133	Methylene chloride	2.5	2.5	0	25	
			Vinyl chloride	0.5	4	156	5	
PIN15–M18S	PIN15–0581	B151115	Methylene chloride	0.42	2.5	142	25	
			o–Xylene	0.5	0.4	22	5	
PIN15–M31S	PIN12–0594	B151218\ B151220	Benzene	6.3	5	23	50	
			cis–1,2–Dichloroethene	260	480	59	50	Fail
			Methylene chloride	9.4	4.2	76	250	
			trans–1,2–Dichloroethene	2	5	86	50	
			Vinyl chloride	420	72	141	50	Fail
PIN15–M37D	PIN15–0580	B151220	Benzene	190	200	5	1250	
			cis–1,2–Dichloroethene	1600	1700	6	1250	
			Methylene chloride	870	40	182	6250	
			Toluene	8400	8700	4	1250	
			Vinyl chloride	18000	19000	5	1250	
PIN15–RW15	PIN15–0583	B151175	1,1–Dichloroethene	43	31	32	500	
			cis–1,2–Dichloroethene	6000	6600	10	500	
			Methylene chloride	330	660	67	2500	
			Toluene	22	125	140	500	
			trans–1,2–Dichloroethene	120	75	46	500	
			Trichloroethene	3500	3600	3	500	
			Vinyl chloride	3200	2900	10	500	
PIN18–0500	PIN18–0651	B151219	Arsenic	0.25	0.25	0	0.05	
			cis–1,2–Dichloroethene	3.3	0.5	147	5	
			Methylene chloride	0.56	0.67	18	25	
			trans–1,2–Dichloroethene	2.1	0.5	123	5	
			Trichloroethene	0.47	0.5	6	5	
PIN18–0507	PIN18–0655	B151218	Arsenic not detected					
PIN18–0509	PIN18–0650	B151129	Methylene chloride	0.55	0.71	25	25	

[a]S = Original sample (N001), VOC concentration in mg/L.
[b]D = Duplicate sample (N002), VOC concentration in mg/L.
[c]DL = Detected limit.
[d]Fail is an RPD greater than "30% and more than 5 times the detection limit. F=fail.

Appendix B

Laboratory Reports—April to June 2001

Appendix C

Laboratory Reports for WWNA—February to April 2001

Appendix D

Northeast Site Treatment System Historical Data Table

Table D–1. Historical Summary of Groundwater Recovery at the Northeast Site and Building 100

Report Date	Quarterly (gallons)	Total To Date (gallons)
April–June 1997	356,886	356,886
July–September 1997	1,899,871	2,256,757
October–December 1997	2,265,460	4,522,217
January–March 1998	2,358,081	6,880,298
April–June 1998	1,693,697	8,573,995
July–September 1998	0	8,573,995
October–December 1998	0	8,573,995
January–March 1999	848,912	9,422,907
April–June 1999	1,985,705	11,408,612
July–September 1999	2,158,568	13,567,270
October–December 1999	2,285,471	15,852,741
January–March 2000	1,670,059	17,522,801
April–June 2000	2,031,821	19,554,622
July–September 2000	2,728,441	22,283,063
October–December 2000	2,416,705	24,699,768
January–March 2001	2,977,868	27,677,636
April–June 2001	2,452,063	30,129,699

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